• **How much** does it cost to maintain loading machines? What policies and maintenance practices are worth while to a company producing all of its annual output mechanically? These vital questions are answered and a cross-section of general procedure—based on the Union Pacific Coal Co.'s 24 years of continuous experience—will be given by Clarence A. Nolph, assistant electrical engineer, in an article in an early issue of Coal Age.

• **Mechanical loading** is the only resource in certain types of coal bedding, and the Sullivan Trail Coal Co. has shown that, no matter how unexpected were the contours of the workings, a profitable answer was supplied by the mechanisms and a few gravity chutes. Thus this anthracite operation definitely contradicts the time-worn declaration "it can't be done," and proves it can be done economically only by mechanization. R. Dawson Hall tells the story of it all, p. 37.

• **Modernization** has had its greatest impetus in loading-machine installations for the past three years in West Virginia, and low production costs have naturally resulted. Rising from an output of 290,379 tons from six loading machines in Monongalia County only in 1935 to a production of 6,304,999 tons by machines in the five counties in 1938, northern West Virginia—which will be featured in December Coal Age as the 19th Annual Model Mining Number — presents factual evidence of low-cost coal and how to get it.

• **Heating** the wet coal and then exposing it to cold-air currents to both carry off evaporated moisture and cool the product is an essential element in the heat-drying system at Truax-Traer's Fiatt plant. Screen action and squeezing under gas pressure also play their parts, as detailed in the report on the system by Ivan Given on p. 49, including full operating data.

• **Next month** Coal Age will almost be a miniature convention issue with reports of the joint meeting of the Coal Division, A.I.M.&M.E., and Fuels Division, A.S.M.E., Columbus, Ohio; the National Safety Council Congress, Atlantic City, N. J.; and the National Coal Association meeting in New York City. Editorial staff coverage of the high points of such meetings give those attending a record of events and brings those unable to attend a close-up of the things they missed.

• **A 50-hp.** fan motor, a mine only 1¾ miles in and still bad air—that is the picture outlined by Anthony Shacikoski as a background for a revised system of mining designed to provide solid pillars between intakes and returns. Results included: 25-hp. motor on the new fan and nearly twice the air per split, even though the mine now is four miles in. Mr. Shacikoski elaborates on these points in this issue, p. 59.

COAL AGE

A McGRAW-HILL PUBLICATION

With which is consolidated "The Colliery Engineer" and "Mines and Minerals"
Published by McGraw-Hill Publishing Company, Inc.
H. W. CLARKE, Vice-President

OCTOBER 1939

CONTENTS

Volume 44 No. 10

Brandycamp tipple from rock dump; see p. 56

COAL AGE is published monthly on the 1st. $3 per year in the United States, Canada, Mexico, Central and South America; other countries, $5 or 20 shillings. Single copies, 35 cents each. Entered as second-class matter Oct. 14, 1936, at the Post Office at Albany, N. Y., under the Act of March 3, 1879. Printed in the U.S.A. Cable address: "McGrawhill, N. Y." Member A.B.P. Member A.B.C.

McGRAW-HILL PUBLISHING COMPANY, INC.
JAMES H. McGRAW, Founder and Honorary Chairman
Publication Office, 99-129 North Broadway, Albany, N. Y.
Editorial and Executive Offices, 330 West 42d St., New York, N. Y.

JAMES H. McGRAW, JR., President — HOWARD EHRLICH, Executive Vice-President — MASON BRITTON, Vice-Chairman
B. R. PUTNAM, Treasurer — D. C. McGRAW, Secretary — J. E. BLACKBURN, JR., Circulation Manager

Branch Offices: 520 North Michigan Ave., Chicago; 68 Post St., San Francisco; Aldwych House, Aldwych, London, WC 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta, Ga.

WAR IS DECLARED ON FRICTION DEVILS

DON'T BE NEUTRAL — IT'S COSTLY! Attack your enemy, Friction, with the best weapon available—Hulburt Quality Grease. Put your equipment on a "peace time" basis at the lowest possible cost.

HULBURT

BUSINESS
Stands Against War

Let us take a clear-eyed look at this thing we call War.

WAR is a political tool for domination or suppression; a device of futility—unless it be waged in defense of our homes, our property or our rights—in the preservation of our liberty. War destroys everything it touches. So completely does it disrupt the order and progress of civilization that humanity falters.

Dangerously widespread amongst our people today is the assumption that our participation in the European War is inevitable. Some mistrust the temper and program of the federal government as likely to lead us into it; others fear that our sympathies will make us an easy prey to the propagandists; still others suspect that business and industry, in a blind greed for profits, may involve us in the conflict.

To give credence to such beliefs is to deny that we are normal individuals, endowed with intelligence and a will, or the ability, as a people, to profit by our own experience. In all human experience, death only is inevitable.

To say that Industry and Business want war or will encourage, directly or indirectly, our participation in the present war, is a vicious and deliberate lie.

The millions of us who, since the World War twenty-five years ago, have devoted all our efforts and energies to creating and building and improving that which we know today as American Industry and Business, are convinced that the destiny of this country can be wrought only in peace. We cannot, and *must* not, stand aside and watch even the little progress we have made since that war sacrificed to the pestilence of another world conflict. We who are trying to build a lasting heritage for those who will follow us truly know that "there never was a good war or a bad peace".

Perhaps it is time to re-emphasize two of the three elements of our democratic faith, so simply stated by Abraham Lincoln, "that government of the people, by the people, for the people, shall not perish from the earth". Now, of all times, it will be wise to inform our political stewards that government by the people and for the people must be the guiding principle in what they do during the days to come, and that it is our *will* that in our country peace shall be preserved.

Only the grim and solitary courage of each of us, the determination to exert all our intelligence, all our individual influence in every way, can insure the preservation of peace for our country.

Preparedness we know to be the most effective preventive weapon against the threat of war. We must be certain, therefore, that we provide our air, land and sea forces with the best in armaments and material, in adequate supply to maintain properly and impressively our national responsibilities and defense.

Most important is that we as individuals, thus inspired, band together to exert the full strength of Industry and Business in the maintenance of peace.

If we are to succeed, we must be forceful, we must be articulate. To that purpose we pledge ourselves and the resources of our publications. An expression from our readers will greatly assist in such a mobilization of industrial opinion. Together, in this critical time, we can serve America well!

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

This message is appearing in all McGraw-Hill industrial and business publications, reaching over a million readers.

COAL AGE

Established 1911—McGraw-Hill Publishing Company, Inc.

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

SYDNEY A. HALE, *Editor*

October, 1939

◆

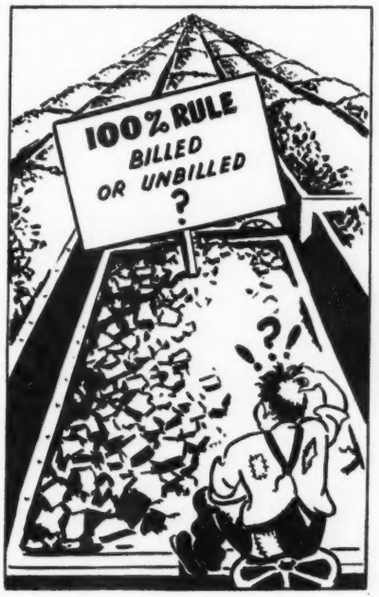
Pertinent and Impertinent

•COAL is not "munitions of war" and is in no way involved in the ban on exportation, states the National Coal Association, "just so that there may be no misunderstanding should there be an occasion to send coal abroad." Is this a bid for war-boom business? Or should we join with competitive fuels and, to quote a recent issue of the *Oil and Gas Journal*, "prefer to sacrifice any temporary gain from war demand for the much larger permanent benefit of expanding consumption in a peaceful world." Well, maybe we'll try a little watchful waiting first to see how noble our competitors are.

•WHILE the coal-mining industry is beating the tom-toms to inflame interest in the condition and adequacy of railroad equipment, it might not be a bad idea to take time out for a peek or two underground. How many otherwise progressive mines are still hauling coal in cars so venerable and dilapidated that they seem more qualified for museum pieces than profit-returning vehicles of transportation?

•DEVELOPMENT of supervisory personnel capable of grasping the opportunities presented by new methods and equipment is one of the biggest tasks confronting the coal-mining industry today. In the past, many companies have discouraged the young engineer from applying his specialized knowledge to coal-production problems by their unwillingness to also make the job attractive in immediate financial remuneration and in opportunities for advancement. Movements such as that initiated by Pittsburgh Coal Co., which recently awarded scholarships at Penn State to two of its ambitious younger mine workers, are welcome evidence that this attitude is changing and that management with an eye to the future is alive to the dangers of a shortage of trained men.

•RAILROADS of the country have reinstated the 100 per cent rule on no bills at all mines. Under this rule, if a mine has unbilled loads equal to its mine rating, it is shut off from receiving any additional empties. There have been times in the past when invocation of that rule has provided a field day for shrewd bargain hunters. It should not so operate under present conditions. But its reinstatement is another vivid warning that, if any shortage in coal supply should develop, transportation will be the bottle-neck responsible.



•AT THE MOMENT four emergency measures affect coal in England. No coal can be sold for export except at a specified price; profits on wholesale domestic sales are limited; no price increases on either domestic or export tonnage may be made without discussion and agreement between the Central Council and the Mines Department; consumption of coal, gas and electricity by domestic consumers will be scaled down to 75 per cent of the amount used during the year ended last June. Only gas and electric consumers of less than 100 therms and 200 units, respectively, escape rationing. Thus war comes to coal in England.

•DURING the Appalachian wage negotiations last spring, many writers blandly called the cessation of work between April 1 and May 13 a strike. Purists in labor terminology, however, meticulously referred to it as a suspension. Both erred, according to a recent mandate of the Board of Review of the Ohio Bureau of Unemployment Compensation.

That august body, by a 2-to-1 decision, classifies the cessation as a lockout and has awarded compensation to the idle mine workers. Why? Because the operators refused "to accept the miners' proposals" for an extension of the 1937–39 basic Appalachian agreement pending the negotiation of a new contract. If a prize is ever given for absurd rulings by State bureaus, the Ohio board should win hands down.

•CARRYING ON through the maze of hereditary tendencies embedded in the Guffey act, the Coal Division of the Interior Department now proposes to change certain producing-district and minimum-price-area boundaries to eliminate unfair competition of producers with mines in one producing district who might also be operating mines in territory not originally included within that district's jurisdiction. Since the bars are down, may we timidly mention the fact that some mines in every area vary widely as to physical characteristics—to say nothing of the basic effect of sound financial structures, completely coordinated management and the installation of modern balanced-capacity equipment on lower-cost coal. Must the farsightedness and ingenuity of low-cost operators be penalized by exorbitant minimum prices designed to protect high-cost output with the law of averages?

War—and Coal

WITH SO MUCH of the world apparently gone mad, sane appraisals become increasingly important—and increasingly difficult. This is particularly true at this moment, when no man knows what direction the European conflagration will take or in what quarter it may break out next. Already it is upsetting the fuel economy of foreign nations; in every coal-producing area here men are asking what it will do to our own.

Definite answer cannot be made. The best it is now possible to do is to draw upon the experiences of the past and contrast the situation which prevailed a quarter of a century ago with that now existent. Such a review must inevitably underscore four major factors—demand, labor supply, productive capacity and transportation. Prices are a secondary factor because, except as they may be artificially controlled, they are molded by the impact of the four primary factors just mentioned.

When the previous great war started, the United States was in the trough of a minor depression. Total coal output in 1914 was less than in the preceding year; 1915 registered a gain of only 3.5 per cent over 1914 and was still 6.7 per cent behind 1913. Demand did not attain real momentum until 1916. This year, without adventitious war demand, production has been running about 10 per cent ahead of 1938. Labor supply is more than ample and, thanks to immigration restrictions, largely unaffected by calls to colors other than our own. This was not true in the early years of the last war.

That war stimulated the greatest expansion in the number of mines in the history of the American coal industry. This cycle of expansion did not end until 1923, and the industry has been paying for it ever since. Today, due to mechanization with its increased productivity per man-shift, mines now on the active list have a potential capacity far in excess of any current demand or any which reasonably can be foreseen over the next several months. As in 1916–18, the critical factor is again transportation. Although the railroads assert their ability to handle a 25 per cent increase in volume, it is significant that they already are tightening up on car supply and planning rehabilitation of idle equipment.

In the light of these factors and past experience, it would seem to be the counsel of wisdom to avoid new mine development except where such development would be economically justifiable without war demands for fuel. Increased modernization of existing properties can take on the load of expansion without the risk of another ten-year liquidation headache afterward. And management anxious for stabilized and profitable operation can afford to lose no time in restudying its methods and equipment with that end in view.

And Now the Farm

FARM MECHANIZATION now comes in for its share of public scrutiny with the release of statistics showing man-hours required to produce specified units of farm commodities during given periods since 1907. As in coal, technologic change in the application of power mechanisms to production is cited as the most obvious cause of decreases in labor required per bushel, bale and ton. Similarily, the economic endeavor to reduce man-power used in the production of a unit shows considerably more progress in some branches of the agricultural industry than in others and certain geographical areas record greater advances than others.

Comparison of the degree of mechanization by these two basic industries during the periods covered discloses the rather startling fact that wheat and oats have outstripped both bituminous and anthracite in increasing output per man employed. Specifically, the average output per man per day of all classes of bituminous workers rose from 3.46 tons in 1910 to 4.62 tons in 1936. Reduced to output per man-hour to compensate for the introduction of the seven-hour day in 1934, the net increase in productivity was 53 per cent. Man-day figures for anthracite production in the same period increased slightly more than 28 per cent.

Meanwhile, from 1909-13 to 1934–36 the man-hours required to produce a bushel of wheat in the United States was cut from 0.89 to 0.41, or an increase of bushels per man-hour from 1.124 to 2.439, or 117 per cent. Oats production has jumped from 2.381 to 3.704 bushels per man-hour—an increase of 55.6 per cent between 1909 and 1936. Production of sugar-beet tonnage per man-hour was increased 29.2 per cent from 1913–17 to 1933–36.

CONVEYORIZATION

+ Meets Puzzling Conditions in Sullivan Trail Coal Co.'s Mines

By R. DAWSON HALL
Engineering Editor, Coal Age

• A quarter century of progress and not a little ingenuity made the Clear Spring operation once again a successful mine. Coal too troubled or too thin for mining in 1911 becomes, after 25 years, the coal resource from which a large and steady tonnage is being obtained, in the producing of which 520 men in three shifts are employed underground, including foremen. Belts, gravity chutes in the rock, shaking and chain-flight conveyors, scrapers and mine cars follow the beds up and down and literally "through thick and thin." One of the beds is being, and another has been, completely first-mined without seeing a mine car except "buggies" for supplies.

ANTHRACITE operators always have welcomed steep pitches, and even coal beds more or less level have given them no trouble, but inclinations in between, especially if rolling and irregular, presented problems which continued to be beyond solution until the advent of conveying equipment. Such a rolling coal area with gentle pitches is found at the Clear Spring mine in the Northern Anthracite Field, at West Pittston, Pa., operated by the Sullivan Trail Coal Co., though here and there are short rolls, or anticlinal folds, with pitches almost vertical, and some of the beds are quite thin. The mine was operated from 1882 to 1911 and closed down for several years after all the coal that appeared at that time minable had been removed from it.

All Conveyor Types Used

Belt, shaking and chain-flight conveyors and scrapers, working always in well-chosen directions and under conditions best suited to their several characteristics, have been arranged to meet the complicated structure of the coal field and to permit beds to be worked which at one time were too thin for operation. In one instance, where a seam was approached from a lower bed through a rockhole, an area in that lower seam entirely surrounded by abandoned workings was operated through an incline driven from the upper seam. Thus, the coal in the lower seam was raised to the upper bed, transported in that measure and then slidden down a rockhole into the lower seam.

Efficiency and economy in operation, rather than adherence to any regular layout, have been the objectives sought. Yet, the dog-leg chambers necessary when the coal floor is irregular and the coal is not transported by machinery are everywhere absent, for conveyors are more flexible than cars. Together with gravity chutes wherever pitches are steep enough to permit coal to run freely and with car haulage from the main scene of operations to the main shaft, the required output of 2,000 tons daily is produced in three shifts from a constricted area by conveyors, though conditions are so unpredictable that problems constantly arise which demand that some new combination of the equipment available be improvised for the occasion.

Some of the territory still available in the Clark seam is believed to be more or less regular and such that the coal area can be divided into symmetrical panels with straight gangway alignments and with chambers driven straight and at right angles to the gangways with the aid of conveyors. But this bed is one that was not mined by the former owners, because the coal, with binder, was only 27 in. thick.

In other sections of the mine, the inclinations may change from, say, 15 per cent down to 22 per cent up and again to 15 per cent down, so that long belts cannot be used and separate units are needed for the several divergent inclinations. Such variations occur and some far more severe present themselves in all the seams at the southern end of the Clear Spring territory.

At this mine, the shaft passes through the following beds: (1) the Checker, which is 9 ft. thick, already well mined when the present company took hold; (2) the Pittston, which is 10 ft. thick; (3) the Top Marcy, which is only 18 to 26 in. thick and which, wherever of the greater thickness, has been approached for mining through rockholes from the lower member of the same seam; (4) the Marcy or Bottom Marcy, which is 5 ft. thick, including a 14-in. layer of fireclay located 25 in. below the top of the seam; (5) the Top Clark, which is quite irregular and about 27 in. thick and will be approached from rockholes in the roof of the lower member of the seam; (6) the Clark, or Bottom Clark, which also is 27 in. thick with a 2-in. band located about 6 in. from the bottom and with about 18 in. of fireclay roof which falls with the coal; (7) the Top Red Ash, 26 in. thick, and (8) the Middle Red Ash, of the same thickness. Below these is the Bottom Red Ash, with a thickness of 7 ft., of which nothing but pillars remains.

Surface Must Be Protected

However, there are some Bottom Red Ash riders from which much coal may be obtained whether by working one of the beds or by combining two beds in a single opera-

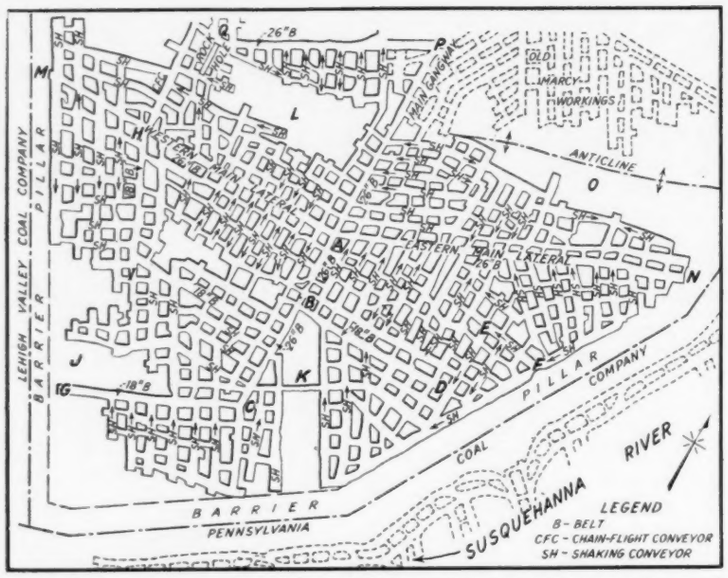


Fig. 1—Bottom Marcy bed workings. A little coal remained in the southern end of the property which the Sullivan Trail company completely conveyorized and first-mined.

tion. As the deeds are so written that surface protection must be provided, no pillars are drawn, and care is taken not to let the quicksands above the rock measures find access to the mine and thus flood the workings and lower the surface.

Because the Pittston bed is being mined from the Marcy through a rockhole, the operations in the latter bed, now practically completed, will be described first. All the coal comes, and will come in the future, to the Marcy landing to be hoisted to the surface. Except for a virgin area in the southern end of the property, this bed was completely first-mined by the Clear Spring Coal Co. before it discontinued operations. In this virgin area, anticlinal and synclinal folds occur running about 20 deg. north of east and 20 deg. south of west and causing the gradients of 15, 22 and 15 per cent already described.

Before these folds were actually encountered, the earlier operating concern had already been discouraged by increasing irregularities and by actual adverse experience in both the Pittston and Marcy beds, especially the former. Recognizing that the boundary was being approached, so that nothing easier to mine lay beyond, and that the haul was long and difficult, the company left the area virgin.

With the facilities available at that early date (1911), who shall say their judgment was not justified? Had the company entered the troubled area in the Marcy, it certainly would have had to withdraw as it did in the Pittston bed.

Yet such is determination, backed by modern machinery and methods, that the Sullivan Trail Coal Co. took 250,000 tons in nine months from this southern area of the Marcy bed, bringing out all the coal through a main gangway 20 ft. wide. All the fireclay parting removed from the bed in driving the roadway was gobbed on one side, thus reducing the effective width to 12 ft.

For 950 ft. (not all of which is shown on Fig. 1) the gangway dipped 15 per cent to a low point marked *A*. Then, for another 200 ft. it turned upward 22 per cent, reaching *B*. For these lengths of roadway, two 26-in. troughed belts were installed in tandem, the rear belt depositing coal in the tail end of the outby belt. Then the roadway dipped again beyond *B* at 15 per cent and eventually, toward the southern boundary, rose about as heavily.

From *A* a lateral gangway 900 ft. long was driven almost due west to the western boundary at *M* and from the same point *A* another lateral, *AN*, 1,000 ft. long, about 20 deg. north of east, was driven to the southeastern boundary so as to reach that irregular line at a suitably distant point, *N*, without departing too much from the line of the basin. This was possible because the contours curved somewhat in that direction. The lateral rose, however, a little as it went east. In both these gangways were installed 26-in. troughed belt conveyors to feed at *A* into the belt on the main gangway.

At a point, *B*, 215 ft. inby from *A*, another lateral was started from the main gangway in a direction due east. It was extended 475 ft. to a point, *D*, not far from the boundary, and it was equipped with an 18-in. flat belt conveyor. As it deviated from the direction of the main lateral about 20 deg., it was necessary to drive a gangway, *DE*, due north, 200 ft. long, to give access to unreached coal. This gangway was furnished with a shaker conveyor. A lateral, *EF*, from this gangway, 160 ft. long, running due east and equipped with another shaking conveyor, almost reached the barrier pillar. This afforded access to the rest of the triangle lying to the east of the main gangway.

From the end of the main gangway at *C* a lateral was driven 20 deg. south of west (parallel to the eastern main lateral) for a distance of 500 ft. For this, as the coal to be removed by it came in small volume, an 18-in. flat belt conveyor sufficed. Another important gangway, *HI*, started almost 600 ft. from *A* along the western main lateral, ran roughly 500 ft. parallel to the western boundary line and almost southeast. In this a similar belt was installed.

However, this description, complex as it is, does not detail all the gangways with their belts or shaking chutes, nor does it describe many chambers fitted with shaking conveyors which were made to serve not only as chambers but as gangways from which other chambers were driven. Some of the shakers by which short rooms were advanced and which did not have their own drive units were operated by the drive units of longer rooms through bell cranks.

Plus-Minus Gradients Worked

It will be noted that where the main gangway dipped, as it did approaching *A*, the chambers were driven more or less level along the strike and coal was brought by shaking conveyors to the mother belt. From *A* to *B*, as the main gangway rose 22 per cent and as the eastern and western main laterals had been started, it was possible to take advantage of the gradient and drive the chambers not from the main gangway but from the laterals, which, being in a basin, gave opportunity on both flanks for the use of many shakers. After *B* was reached and the gradient at first was level and then downward, the main gangway became a "chamber heading" with chambers driven on either side, which, being nearly level and delivering to a belt and not to cars, were readily drivable with ordinary shaking chutes.

All the chambers driven from the lateral *CG* toward the boundary line rose 4 or 5 per cent, and shaking conveyors were used in these. It is not necessary to discuss the systems of mining adopted in other chambers, as no different principles from those already described were involved. Areas *J* and *K* were left unmined because the company did not own the mineral, though in some parts of the former area the coal was left untouched because the rock cover over the coal was too thin to furnish adequate protection against a possible incursion of quicksand. Area *L* is as it was when the last survey was made and the coal that still remains soon will be first-mined. Area *O* south of the abrupt anticline has been first-mined by chutes. Work in the Marcy bed soon will be finished; all the pillars will be left in place, as the owners of the surface are entitled by law to surface support. The only gangway left in operation will be that marked *PQ*, by which access is provided to the Pittston bed through a rockhole.

Heavy Barrier Pillars Needed

Against the property of the Pennsylvania Coal Co. the barrier as left by the Sullivan Trail Coal Co. is 60 ft. wide; a pillar 50 ft. wide is left against the Lehigh Valley Coal Co. These other companies have left pillars of equal width. That adjoining the P. C. Co. has been made the larger because of nearness to the Susquehanna River. All rooms in the Marcy bed are 25 ft. wide with 27-ft. pillars between them. Thus, allowing for crosscuts, airways and gangways, a little more than half the coal is removed.

At the end of the mother belt is a 15-ton bin, holding about 3½ cars of coal, into which that belt discharges. An ordinary gate, like that on the chute of a battery, is used for releasing the coal into the mine cars. The belt has capacity to load 130 cars in a 7-hour day, but 100 to 110 is the usual loading. Each car holds about 4 tons, and eight cars constitute a trip.

A run-around track enables an engineman operating a small hoist to place another trip behind that being loaded, so that loading can be continuous. Two "toppers" on each shift fill the cars, and a triprider sprags them, spotting them under the chute for loading. He also attaches the cars to the rope so that the engineer can lower them down the slight incline beyond the chute. Finally, he couples the rope to the empties so that these cars can be drawn back of the loads. This arrangement is necessary because the tail track could not be extended far enough behind the switch for the locomotive to place the cars.

Though the southern area of the Pittston seam was not as virgin as the Marcy when the Clear Spring mine was reopened, and cannot be mined as far south for lack of cover, it is being developed to take the place of the latter seam as fast as it ceases to maintain production. Much coal already had been taken from it. The gangway *PQ* (Fig. 1) in the Marcy bed leads to an 8x12-ft. rockhole in the Pittston seam at a point where the two seams are 80 ft. apart.

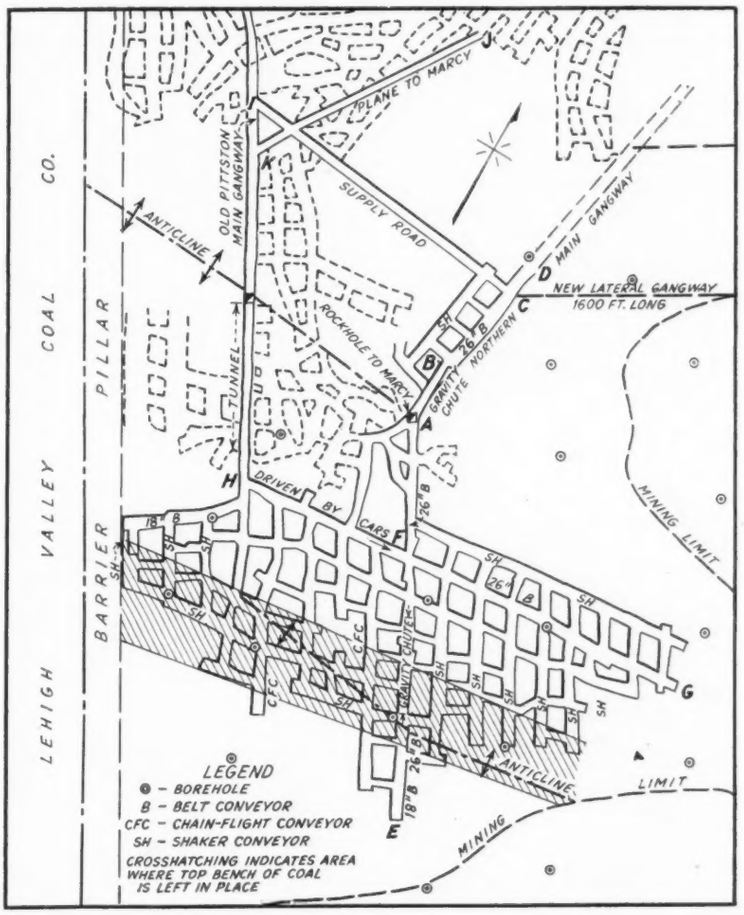
All the coal that comes down this rockhole is carried by a 26-in. troughed belt conveyor to the similar conveyor running in the Marcy main gangway. The rockhole, which pitches at about 45 deg. to the horizontal and is about 120 ft. long, reaches the Pittston bed at *A* (Fig. 2), which is about at the foot of a steep pitch in that bed which rises about 75 ft. before it reaches the anticline.

In places this pitch is almost vertical, but the rock has been cut so as to form a 60-deg. gravity chute 85 ft. long in which the coal slides to the rockhole from a gangway, *BD*, now 800 ft. long and going a little east of north with a 26-in. troughed belt conveyor. The paralleling airway is driven by a shaking conveyor. Both gangway and airway dip about 14 per cent.

At a point, *C*, 250 ft. from the rockhole, a gangway shown in broken lines has been driven in a direction about 20 deg. north of east. This will be eventually 1,600 ft. long and be equipped with a 26-in. belt conveyor. Another parallel gangway, also shown in broken lines, will be driven from a point 215 ft. further inby.

In a direction almost the reverse of the northern main gangway, almost southeast, another main gangway, *AE*, has been driven to obtain coal from the south. For about 250 ft. this gangway goes downhill 12 per cent and then begins to pitch almost as heavily as it does at the rockhole.

Fig. 2—Pittston bed workings. Cross-hatching shows area where, because of inadequate cover, only the lower bench of coal will be first-mined; pillars will be left in place as usual. Broken lines show Bottom Marcy working where roof is stronger and places wider.



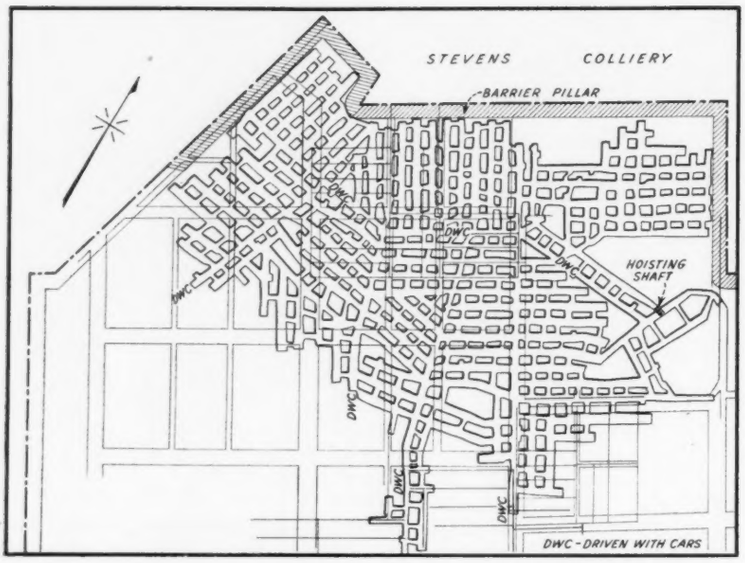


Fig. 3—Bottom Clark bed workings. Transportation is by mine cars filled in trips by conveyors designed to lift the coal into cars up a steep inclination. Shaker conveyors are used in rooms and airways. Coal is cut by shortwall machines.

In consequence, the 26-in. belt conveyor installed in the gangway gives place to a chute for about 90 ft., shooting up 35 ft., after which the coal bed flattens out to a 15-per-cent uphill gradient and another 26-in. belt conveyor is installed. When the top of the anticline is reached, the coal bed dips 15 per cent, and another belt is provided, this time only an 18-in. flat belt, as the boundary is being approached.

At *F* in this southern main gangway, another gangway, *FG*, has been driven 900 ft. with the aid of a 26-in. belt; the airway was driven by shaking conveyors. The gangway that appears in this drawing to have been driven from *F* in the opposite direction, *FH*, from that just described was the first driving work in the Pittston bed undertaken by the Sullivan Trail Coal Co. It, however, was driven with cars toward *F* and not in the reverse direction. Cars were used because there was then much uncertainty as to the quantity of coal still available in that section.

The cars were pulled up a rock plane, *JK*, from the Marcy bed (shown at the top of Fig. 2), which plane had been driven to find a tunnel known to have been constructed by the Clear Spring Coal Co. through a steep roll in the Pittston bed. The tunnel was not struck, but the gangway leading to it was. When the gangway and tunnel had been put in condition, it was possible to bring cars beyond the roll, enabling the management to get its bearings. As is customary, roads are laid alongside the conveyors in gangways for the transportation of material. The steep chutes and the rockhole make this a problem in the Pittston seam, but by means of the rock plane and tunnel this difficulty has been met for the southern area in the Pittston.

Supplies destined to the area north of the rockhole also are pulled up the plane *JK* from the Marcy bed and reach the Pittston main gangway near a point, *I*, where that gangway encounters a roll. Through this roll an 8x12-ft. rockhole is driven which passes from the Pittston bed back into the Pittston. A road for a 28-in.-gage buggy is laid in this rockhole, and supply-laden cars arriving at its foot are unloaded into a small car, or "buggy," which is drawn up the inclination by a hoist. At the top of the rockhole, supplies are placed in mine cars for distribution to all parts of the northern section.

In all the work done in the Pittston bed the chambers are driven at 45-ft. centers and 20 ft. wide wherever boreholes from the surface or from the mine have shown the rock to be thick enough between quicksand and coal to permit places to be driven of that width. When the rock was found to be thin, the width of the chambers was reduced to 15 ft. Only the lower 5-ft. bench of coal is removed as places of any kind are advanced. The upper 5 ft. is taken on the retreat except where the thinness of the rock above makes such recovery undesirable. Chambers usually are 300 ft. long and in most cases have been mined by the aid of conveyors. Supplies are brought in by two men on each shift.

Only in the Clark bed are undercutting machines used; these are Jeffrey 35-L shortwall units. In some places the irregularity of the bottom or a streak of pyrite makes undercutting almost impossible, and in that event the coal is shot from the solid. The seam being only 27 in. thick, every effort is made to cut as little of it as possible to bugdust, so the kerf is held down to 4½ in.

All gangways in the Clark bed have been driven with cars as a means of transportation, but all the chambers in the bed have been made with the aid of conveyors, mainly shakers, with a few chain-flight conveyors. Much of the coal has been loaded onto Vulcan shaking chutes at the mouths of the chambers, lifted on an uphill shaking section having lifting legs, otherwise known as carrier arms (described in *Coal Age*, September, 1937, p. 44), and deposited in mine cars by a chute projecting over the trip. LaDel shakers have also been used for the same purpose.

Thin Seam Now Mined

This bed, though thin and having a treacherous slate roof, is less troubled by anticlines than the others, mainly perhaps because the area being worked is in the northern part of the territory, which in general is less disturbed than the southern area. The Clear Spring Coal Co. did not mine the coal in this bed at all, as it was so thin that cars could not be taken into rooms without taking down bottom or lifting top and hauling away rock as well as coal. For this reason the Sullivan Trail Coal Co. finds itself in an area where the lie of the bed is as favorable as that in which the Clear Spring Coal Co. for the most part operated. Because the bed is being entered for the first time, it is dry and dusty, whereas all the beds above it are quite wet.

The intention is to drive the gangways in a regular panel system. It is expected that, for a while at least, the gradients on the southeast gangways will not exceed 4 per cent and the cross gangways will be nearly level. All gangway haulage will be by car. Chambers are driven 34 ft. wide and at 62-ft. centers. Only by the use of conveyors could a seam so thin as this and so relatively flat be mined at present wages and prices.

Approach to the Clark bed is by a slope driven from the Marcy bed. The Top Clark will be mined from the Clark bed through rockholes. A rock slope will be driven from the main Clark gangway to reach the

Top, Middle and Bottom Red Ash for dewatering and mining. About half the coal in the Red Ash will be recovered through this rock slope. The Top and Middle Red Ash beds, where above the water, already are conveyorized, but only around the shaft. They were never much mined by the Clear Spring Coal Co. Over the Bottom Red Ash are some riders which in places are of minable thickness, and mining of these is contemplated where feasible.

The Top Marcy bed, which was entirely virgin when the Sullivan Trail Coal Co. reopened Clear Spring mine, is from 15 to 22 ft. above the Bottom Marcy bed and was approached through six 8x12-ft. rockholes and first-mined throughout. These rockholes contained not only a chute but also a 28-in. buggy track, so that 36-in.-gage cars of materials could be unloaded at the bottom of the rockhole and loaded into the buggy and taken in that small car to the mouths of the chambers in the Top Marcy.

Its coal was mined by the panel system, as it was reasonably regular, and 18- and 26-in. belts were used with shaking conveyors for gangway transportation purposes. No coal cars were used anywhere in the mining of this upper seam. Props and other materials could have been taken to the rooms by reversing the belts, and this was done when time was available, but with three-shift operation, little opportunity was afforded. In general, the coal was cut by shortwall machines.

Transportation Machinery, Clear Spring Mine

45 shaking chute conveyors: 19 Vulcan EC-1, 3 Vulcan ET-1, 3 Vulcan ET-0, 18 LaDel SLS-11, 2LaDel SLS-14.
10 chain flight conveyors: 6 Jeffrey, 4 LaDel.
8 belt-line conveyors: 6 LaDel 26-in. troughed belt units, 1,500 ft. long; 2 LaDel 18-in. flat belt units, 500 ft. long.
6 scraper hoist loaders: Sullivan HD E-15.
6 locomotives: 1 Westinghouse 6-ton, gathering (in Marcy); 3 General Electric, 7½-ton. gathering (in Clark); 1 General Electric, 13-ton, main haulage (in Marcy); and 1 General Electric, 10-ton, main haulage (in Marcy).
12 rope-haulage single-drup locomotives: One 112-hp. (Clark slope), one 30-hp. (Marcy haulage), one 50-hp. (Pittston slope), three 15-hp., five 10-hp. and one 25-hp. gathering.
14 shortwall mining machines: 10 Jeffrey 35-L; 1 Jeffrey 24-B, 1 "Master" Sullivan, 1 CR-8 and 1 Goodman.

At one place under the Top Marcy was a large patch of Bottom Marcy that had not been mined. In consequence, a rockhole was driven down to the Bottom Marcy for mining this coal. But, as it seemed that the work in the Bottom Marcy would not keep pace with the work in the Top Marcy while operating through this rockhole, it was decided to convert it into a 16-deg. slope so that an 18-in. belt conveyor could be installed to bring the coal to the Top Marcy and discharge it into the main 26-in. belt conveyor at that point.

The Checker bed was already well first-mined when the present company reopened the mine except in the southern region and where new leases covering the bed were obtained. Most of the gangway coal was transported by cars, as the thickness of the coal and the lay of the seam favored that haulage system. The work was laid out in panels, and shaking conveyors were used in rooms.

In the operation of the mine, shaker pans are 12 in. wide and 10 ft. long. All the equipment is driven by a.c. current except the locomotives. Of the Sullivan Trail Coal Co., Louis Pagnotti is president; James Tedesco, general manager; Joseph Grill, mine superintendent, and Joseph Menn, electrical and mechanical foreman.

SCRAPER STRIPPING TO 50 FT.

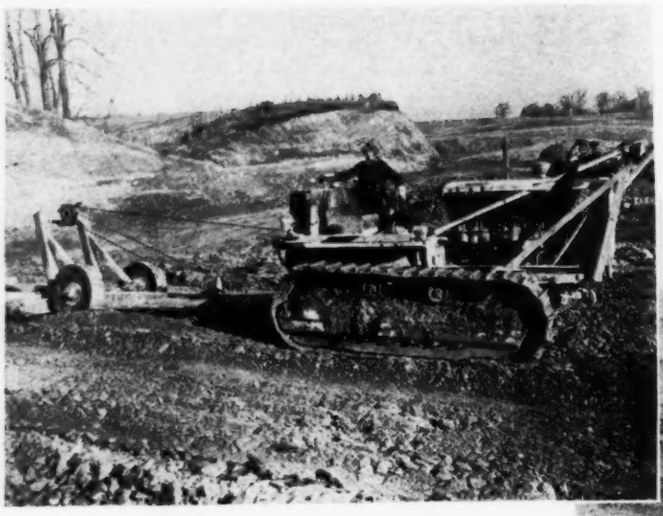
+ With Two-Bench Loading and Cleaning

Practiced at Zanesville Truck Mine

ALTHOUGH the seam contains a parting, power cleaning and power loading are the practices at the strip pit of the Hillside Coal Co.'s truck "cash-and-carry" mine at Zanesville, Ohio. Tractors and scrapers remove the overburden and hired trucks transport the coal three miles from pit to tipple. The normal production of 300 to 500 tons per day is prepared in a vibrating-screen tipple which includes five bins whose aggregate capacity is 1,000 tons. The mine is relatively new—started selling coal in September, 1937—but handling bulk materials is an old story for the owners, the Dunzweiler Construction Co., of Zanesville.

In the pit now being worked, which is the first that has been opened, about 15 acres of coal remains. It is the No. 7 seam, averaging 5 ft. thick and containing a parting 1 in. thick and situated 2 ft. 4 in. from the bottom. Cover averages 22 ft. and the maximum that has been stripped in this pit is 50 ft. Directly over the coal is a shale averaging 10 ft. in thickness which is dug without shooting. In places there is a hard rock ranging up to 2 ft. in thickness between the coal and shale and it must be shot. Surface value in this vicinity, as farm land, is about $80 per acre.

Stripping equipment consists of two 95-hp. RD-8 diesel Caterpillar tractors each pulling a LeTourneau "Carryall," one of which is a 12-yd. and the other a 13-yd. and both are mounted on rubber tires. Breaking up the shale ready for these wagon scrapers is done with a LeTourneau heavy-duty "Rooter" pulled by one of the RD-8 tractors. An "Angledozer" of the same make and for attachment to the same tractors is used for cleaning off the top of the coal, scraping away the parting after the upper bench has been



"Rooting" up the 10 ft. of shale which lies next above the coal.

Angledozer starting down and then across to remove from the top of the coal the dirt left by the scrapers.

Loading the bottom bench with the 1½-yd. shovel after the parting has been cleaned away. This narrow pit is a "finish off" and is not typical as to width. R. W. Dunzweiler is beside truck.

William Rushton writes the ticket for a 12-ton cash-and-carry load.

The two wagon scrapers exposing several acres of coal to daylight where maximum cover reaches 50 ft. Floodlights (one in right foreground) aid night shifts.

loaded, and widening dirt banks or fills as an alternative to owning a back-dump scraper.

Dirt hauls with the "Carryall" wagons average around 600 ft. and up to the time of this writing something over 400,000 cu.yd. had been moved and the pit had produced 80,000 tons of coal. One tractor and "Carryall" moves 100 cu.yd. per hour a distance of 600 ft. As much as three acres of coal has been exposed to daylight at one time ready for the busy winter season. Stripping goes on three shifts and after dark the machine headlights are augmented by General Electric 500-watt floodlighting units resting on the ground at the top of the highwall.

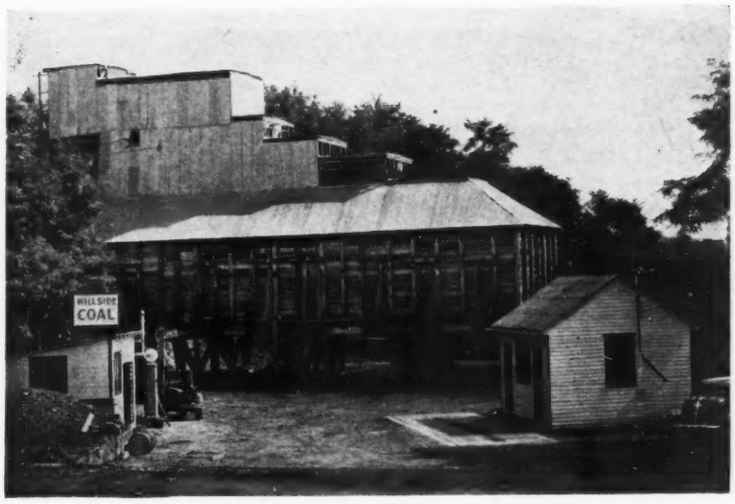
Stripping Cost, 10c. Cu.Yd.

Stripping cost is 9 to 10c. per cubic yard—"perhaps closer to 10c., everything included," in the words of Earl J. Dunzweiler, general foreman. New blades for the scrapers and wire-rope renewals are the principal items of maintenance. Blades are purchased with Stellite facing specified and these blades are not resharpened. Wire-rope replacements for moving the 400,000 cu.yd. have amounted to $1,000. The rope used is ½-in. preformed 6x19 Langlay type.

Drainage ditches are dug with an Insley crawler-type gasoline crane with 1-yd. clam bucket. For this machine, a boom, ⅝-yd. dipper and auxiliaries are on hand for converting it to a shovel and it was so used for loading coal before a new 1½-yd. shovel was purchased for that specific purpose.

The coal is loaded without shooting and the top bench over a considerable area is taken first. One of the RD-8 Caterpillars with "Angledozer" attached then scrapes off the parting preparatory to loading the bottom bench. The new loader, purchased last year, is a Koehring 1½-yd. Model 501 powered by a Wisconsin 80-hp. gasoline engine. Boom length is 30 ft. and the dipper sticks are 20 ft. A 65-ft. boom and 1½-yd. clam bucket were included in the purchase and are available for ditching and other excavating.

The loading shovel and tipple operate one shift. One coal-company truck is kept working with the hired trucks in carrying the coal the three miles from pit to tipple. The object of this one company truck is to serve as a yardstick of costs and to check on the road condition and general performance. Truckers, furnishing their own equipment, are paid 14c. per ton and they haul loads of 6 tons.



Tipple bins when chock-full hold 1,000 tons of prepared coal. Trucks dump into the top of the tipple from a hillside road

The tipple is situated just outside the limits of Zanesville and advantage was taken of a hillside so that the trucks dump at the top of the structure and gravity aids in preparation and distribution. From the dump hopper a Jeffrey 48-in.x16-ft. apron conveyor and picking table feeds the coal to a three-deck vibrating Nelsonville Electric screen. Sizes regularly made are: 4-in. lump, 4x2-in. egg, 2x1¼-in. nut, 1¼x⅝-in. stoker, and minus ⅝-in. slack.

Belt conveyors, one 30-in. and another 18-in., carry the lump and egg sizes to their respective bins and a picker is stationed along the egg belt. If run-of-mine is to be loaded it also is carried on the 30-in. belt and delivered to the farthest bin. Both of the belts were supplied by the Nelsonville Electric Co. Purchased power at 220 volts a.c. operates the five motors which drive the tipple machinery. The sizes range from 3 to 8 hp. and the total connected-horsepower is 28.

Trucks Quickly Loaded

Purchasers of coal appreciate rapid loading, and to satisfy that demand the lump, egg and nut bins are equipped with multiple loading pockets some of which are near the center of the bins, which, although they have inverted-V bottoms, are not sufficiently steep to provide free running. With this arrangement, even though a bin is nearly empty, the coal can be gotten from one pocket or another. Number of loading pockets per bin are: lump, 4; egg, 6; nut, 6; stoker, 2; and slack, 2.

Size yields since the mine started has averaged as follows: lump 35 per cent; egg, 40 per cent; and other sizes, 25 per cent. Posted prices during the past winter season were: lump, $2.50; screened run-of-mine, $2.25; egg, $2.00; stoker, $1.00; nut, $1.50; and slack, 50c. The advertised specifications of the lump are: 13,314 B.t.u.; 6.96 per cent ash; sulphur, 2.82 per cent; and ash fusion temperature, 2,200 deg. F.

Serves Central Ohio Market

To a brick yard in Upper Sandusky, 110 miles by highway, is the greatest distance that coal is regularly hauled. All of the coal moves into the northwest quadrant, and Columbus, Newark and Mount Vernon are the principal markets. The company puts forth no sales effort and thus has no sales expense except at the tipple. The truck scale, which has a 9x34-ft. platform, is a 39½-ton Howe with Weightograph. The platform will accommodate both tractor and trailer of the largest units, which in some instances have taken 16-ton loads.

Operation of the mine is continued during the summer and the goal is to continue to produce 300 tons per day, which amount is required to hold the cost per ton to an economic figure. Size maximums of stove and egg are increased during the warm season and when demand for lump drags behind production that size is stored on the ground near the tipple.

The Hillside Coal Co. is headed by R. W. Dunzweiler and, as already mentioned, Earl J. Dunzweiler is general foreman. Roy Plummer is secretary-treasurer and William Rushton handles the weighing and selling at the tipple.

IS INDUSTRY RESPONDING

+ To Demand for Cleaner Product?

PUBLIC OPINION on the coal industry and its problems is neither flattering nor well-informed. Evidence on that score was presented in these pages three months ago when *Coal Age* published the results of a Gallup-type poll of consumers made for it by Hartwell, Jobson & Kibbe, public-relations counselors. This survey sampled consumer reactions to the industry and its service in the Middle Atlantic and New England States, Ohio, Wisconsin and Colorado, and recorded a sad tale of ignorance, misinformation and apathy.

In the original poll, people in all walks of life in the areas just mentioned were personally interviewed and asked nineteen specific questions. Broadly speaking, these questions had two major objectives: one was to test popular knowledge and opinion of the industry and its internal problems, such as labor, regulation and financial returns; the second was to determine by this sampling method what the average consumer thinks of the product itself and the service rendered the public by the industry in merchandising that product ("John Q. Public Answers Nineteen Questions on Coal," by Dickson Hartwell; *Coal Age*, July, 1939, p. 33).

Coal Gets a Black Eye

One of the most disturbing features of this poll was the fact that only 12 per cent of the consumers interviewed gave coal a preference rating on the score of cleanliness, while oil had a 57 per cent and gas a 51 per cent rating on that point in the same survey. Convenience ratings were: Coal, 7 per cent; oil, 61 per cent; gas, 50 per cent. Such low ratings for coal in comparison with the much more favorable ratings accorded its competitors naturally raise two basic questions:

1. What and how much is the coal industry doing to make its product clean and attractive to the consumer?

2. How well has it publicized its efforts in those directions?

That great strides have been made by the industry in improving the character of its product by mechanical cleaning is a matter of public record. For a long time the anthracite division of the industry held the lead in this field, but in recent years bituminous mines also have been pushing forward. Figures compiled by the U. S. Bureau of Mines bear witness to this steady growth. In 1927, only 5.3 per cent

(27,692,000 tons) of the bituminous output was mechanically cleaned; in 1937, according to preliminary estimates, the percentage had risen to 14.7 per cent (65,000,000 tons) of the year's production. Installation of new equipment during that last year added approximately 6,400,000 tons to the annual mechanical-cleaning capacity of the bituminous industry.

In the light of the foregoing figures, it is plain that the low cleanliness rating given coal in the Hartwell poll must have been based upon other factors than the reduction in ash or removal of other impurities at the mines. Since appearance weighs so largely with the average domestic consumer and to some extent, too, with the industrial buyer, editors of *Coal Age* sought the answers to the basic questions raised in a preceding paragraph in an inquiry into the status of dust- and freeze-proof treatment of coal at the mines.

400 Mines Covered

This inquiry, broken down into several specific questions, was addressed to a selected list of several hundred executives of mining companies both large and small. At the time these results were compiled, replies had been received from executives of more than 140 companies controlling nearly 400 mines in 20 coal-producing States. Because some replies covered the operations and practices of more than one company, the actual number of companies from which returns were received in this survey was somewhat greater than the actual number of individual returns. These returns included data on practices and policies at mines in the following States: Alabama, Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Missouri, New Mexico, Ohio, Oklahoma, Pennsylvania (both anthracite and bituminous), Tennessee, Utah, Virginia, Washington, West Virginia and Wyoming. Strictly captive operations, with a few exceptions, were excluded from the survey.

A summary of the trends and industry thinking as revealed in these returns is given in the paragraphs which follow. The percentage figures cited are based not on the total number of replies received but on the total number of executives answering a specific question. This total obviously varied with the specific question since in many cases a negative reply to one question automatically made answers to certain other related queries unnecessary.

1. Are your mines now equipped to ship dustproof-treated coal to retail dealers and carload industrial

buyers? Replies to this question were preponderatingly affirmative in most of the bituminous-producing States; Kansas, Missouri, Ohio and Pennsylvania trends in favor of dustproofing were less marked than in some other areas. In Iowa, New Mexico, the Pennsylvania anthracite region and Washington, however, more replies were received from operators not now equipped than from mines in a position to so treat the coal. For the survey as a whole, the percentage ready to treat domestic sizes was 67.1; industrial coals, 62.9 per cent.

2. Are your mines now equipped to ship freezeproof-treated coal in cold weather? This convenience attribute, apparently, has appealed to a much smaller number of operators, as only 39.7 per cent of the answers to this question were in the affirmative. In a number of cases, however, executives stated that such treatment was unnecessary at their mines either because of the natural character of the coal or because of heat-drying during the process of cleaning and preparation.

3. How do your mines treat this coal and what materials are used in the process? Some form of oil treatment is employed by the majority of the operators answering this question. Oil appears to be the outstanding favorite for dustproofing and runs a close race with calcium chloride in freezeproofing. Waxolizing and other special process also are gaining. A number of cases were reported where a particular company used oil for its dustproofing and calcium chloride to freezeproof shipments.

Policies on Extra Charges

4. Do you charge extra for such treated coal? While a substantial majority (84 per cent) of the operators answering this question replied in the affirmative, policies have not been standardized. Some of the largest companies treating coal, for example, make no extra charge for such treatment. Certain other producers appear to be guided by the immediate competitive-price situation in determining whether or not such a charge should be added. A separate charge for freezeproofing bituminous coal is unusual—even in cases where dustproofing treatment which might do double duty is not employed. In the anthracite region, where most producers insist that their coal needs no dustproofing, a charge for freezeproof treatment is more common.

In most cases where an extra charge is made for treatment, 10c. per ton seems to be the accepted figure—particularly in the Appalachian and Middle Western areas. In Alabama, however, a number of producers assess a 15c. charge and that figure also is added by some West Virginia mines. Outside of Arkansas, where some mines quote 15c., the Southwest also sticks closely to the 10c. charge. In the Far West, the charge ranges from 10 to 25c., with the lower figure applicable to shipments of prepared sizes and the higher to slack coal.

5. Do these extra charges cover the cost of the treatment? "Yes" or "approximately" answered 67.5 per cent of the operators making such an extra charge. Some executives replying in the negative stated that the charge made—usually 10c. per ton—was 3 to 5c. under the actual cost.

Table I—Minimum and Maximum Percentages of Coal Treated for Dustproofing and Freezeproofing in Individual Producing States*.

	Dustproofed Per Cent	Freezeproofed Per Cent
Alabama	4 to 100	.....
Arkansas	10 to 50	15 to 60
Colorado	10 to 15	30†
Illinois	1 to 75	5 to 20
Indiana	1½ to 20	10
Iowa	15	.....
Kansas	20	30
Kentucky	5 to 100†	28 to 30
Maryland	70†	.....
Missouri	100	40
New Mexico	.....	.....
Ohio	15 to 50	70
Oklahoma	100	100
Penna. Anthracite	1	10
Penna. Bituminous	10 to 70‡	10 to 50
Tennessee	10 to 50	40
Utah	10 to 25	12
Virginia	6 to 100	.....
Washington	.....	.....
West Virginia	1 to 100	35 to 70
Wyoming	.....	25 to 60

* The percentage figures given are the lowest reported by any individual operator in the State and the highest reported.
† Stoker coal.
‡ Prepared sizes.

6. What percentage of your output is now dustproofed? As might be expected, this figure at the present time varies widely with different operations and with different coals. Some producers are now treating less than 1 per cent of their output; a few are treating all their coal and a number of others are dustproofing a substantial percentage of their domestic sizes—particularly coal for small stokers. High and low percentages for operators in each of the States for which data are available are shown in Table I.

7. What percentage of your output is now freezeproof? Here again, as in the answers to the preceding question, the figures show a wide variation, ranging from a low of 5 per cent for one Illinois producer to a high of 100 per cent for an Oklahoma operation. Individual high and low percentages for each State are incorporated in Table I.

8. Is the demand for dustproofed coal increasing? No doubt about the trend here with 90.3 per cent of the executives saying "yes."

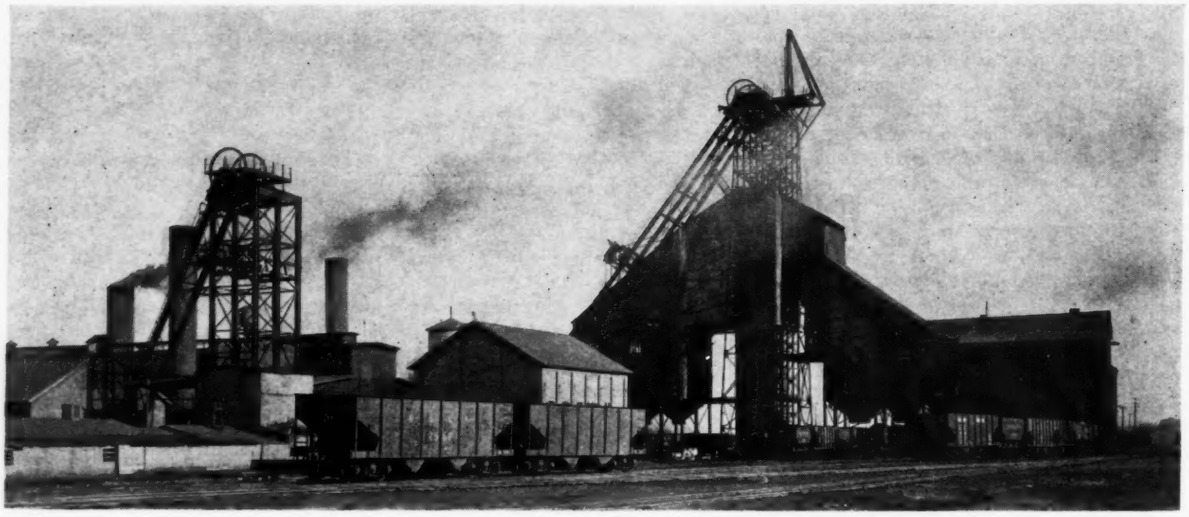
9. Is the demand for freezeproofed coal increasing? Opinion on this question is more widely split, with 53.7 per cent of the operators asserting they sense no increase in such demand.

How Suppliers Can Help

10. What can suppliers of treating materials do to increase their effectiveness and advantages in marketing coal for household and industrial purposes? National and regional advertising is advocated by a number of coal-company executives as the best way to capitalize on the advantages of dustproofed coal for the domestic consumer. The dealer a'so should be educated so that he is in a position to stress the advantages of treated coal to the consumer. Advertising, in the opinion of some operators, also may be used effectively in reaching the industrial consumer; other operators are pessimistic on the possibilities of recovering the extra cost for treating industrial coals and see no reason why such coals should be pushed.

Several operators express the opinion that expansion of the market for treated coal is hampered by the present cost of equipment and treating materials. Others ask for material which will give more lasting treatment. Complaint is still made that some of these materials have an unpleasant odor or a corrosive effect. Continued research to improve both the equipment and the treating materials also is urged by many, while others voice satisfaction with the present state of the treating art.

Much has been done by progressive producers and retailers to improve the quality of the product and of the service, comments the president of one of the largest mining companies in the country, but little, he adds, has been done by the industry as a whole toward publicizing such developments. "The coal industry as an industry should put on a real three- to five-year campaign to sell coal, the coal industry and its relationship and importance to the American people. It would not have cost one-half what we have spent on the Guffey Act in the last three years and I think it would have meant millions of tons and millions of dollars to the coal industry."



No. 2 colliery, Dominion Coal Co., at Glace Bay, N. S. The hoist at the left is No. 20 shaft, formerly No. 9. No. 2 is 850 ft. deep at the Phelan seam.

REALLOCATION AND TUNNELS

+ Make Nova Scotian Undersea Coal More Accessible From Shore

By R. DAWSON HALL
Engineering Editor, Coal Age

• Submarine mining would not be disadvantageous in Cape Breton if, with time, distances from the shafts did not become so excessive. Where coal lies under land areas, shafts for hoisting men and coal and for ventilation can be sunk almost anywhere, and thus every mine can be given a manageable territory, but the undersea mine continually puts out to sea, yet must be serviced solely from the land. Eventually, transportation of men to and from work may limit the area of the workable field. The Dominion Coal Co. is taking two measures to reduce the aggregate length of its slopes: (1) by a reallocation, it widens the area available to each opening, and (2) by a tunnel, it reaches up into an overlying (the Harbour) seam. It probably will yet go by another tunnel to the Hub seam, which is 375 ft. higher.

TO REDUCE the number of slopes operating in the coal seams under the sea and to decrease the cost of their maintenance, the Dominion Coal Co., Ltd., Sydney, N. S., is taking the areas apportioned in earlier years to its several collieries, which are situated at intervals along the coast line, and reallocating the territory so as to lessen the number of operating collieries and to widen their working frontages. Four sets of colliery workings—namely, those of collieries Nos. 2, 6, 14 and 15 (now being worked out up to barrier pillars)—are being abandoned except where former slope haulage roads are found to be available for use as airways.

By the widening of working frontage thus obtained it is possible not only to lessen the number of haulage roads but to retard the speed with which the workings advance seaward. This, not because submarine operation is found difficult in itself or because the depths of the strata and of the overlying sea water create disadvantageous conditions but because there is only one direction of expansion, seaward.

Extended travel of the workings seaward increases the expense of maintenance of haulageways and of the transportation of coal and materials, but probably of paramount importance is the fact that the increase of travel seaward increases the time that workman must expend in proceeding to, and returning from, his place of work. Time of entering and exit now occupies 80 minutes, despite the use of man-haulage trips, so it is clearly seen how this travel reduces effective working time and performance. Another difficulty with extension of workings seaward is ventilation.

Distance from the shore line would not be so disturbing in considering the future of mining in the submarine territory were the measures more nearly flat. However, they pitch from 4 to 25 per cent and in presently unworked areas on the limbs of anticlines local pitches oc-

cur as great as 40 per cent. Powerful hoists are necessary with engine-plane slopes limited to 7,000 ft. in length.

In several of the collieries endless haulages 17,000 ft. long are being operated for the haulage of coal, but this method is too slow for the travel of men. To accommodate these large hoists at such depths as prevail, spacious underground chambers with roofs supported by heavy steel beams must be provided. These beams must be set in rock grooves, one at a time, before the rock between them is brought down.

In places, it is anticipated that even at a distance of five miles from shore the coal will be covered by not more than 3,000 ft. of strata. Operations probably can be conducted under 4,000 ft. of cover or even more and, as no indication of limitation to the seaward extent of the field has yet been encountered, haulages will constantly grow longer and have to be conducted in stages with time-consuming transfers in between.

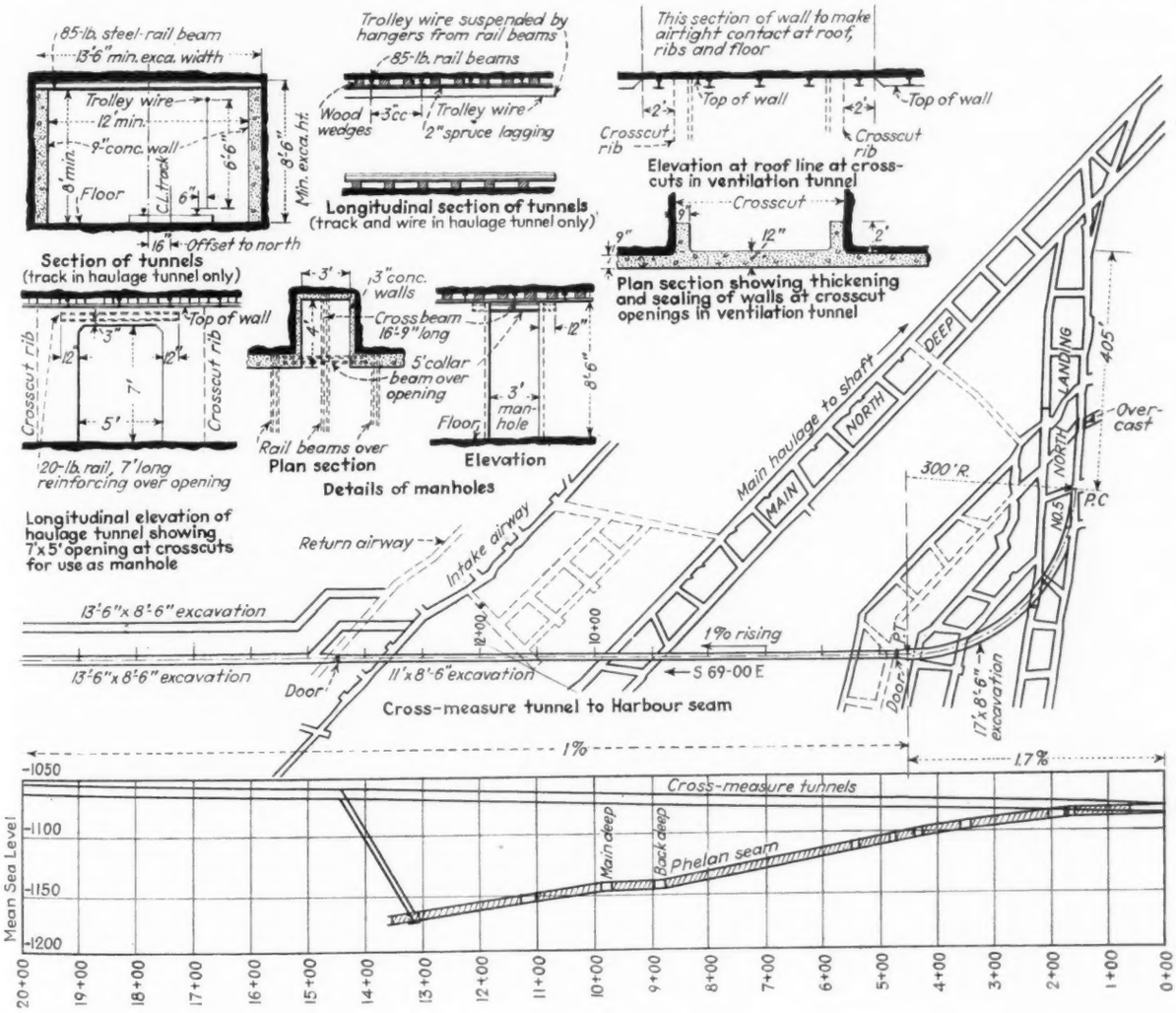
Longwall methods achieving almost complete extraction, combined with the widening of the territories of the several mines to a width more consistent with the opportunities afforded by present mining equipment, will delay the onset of difficulties that will accompany mining of coal four or more miles from shore. An alternative method to continuing advance seaward, of which the operators are now availing themselves, is by mining one or more of the upper seams.

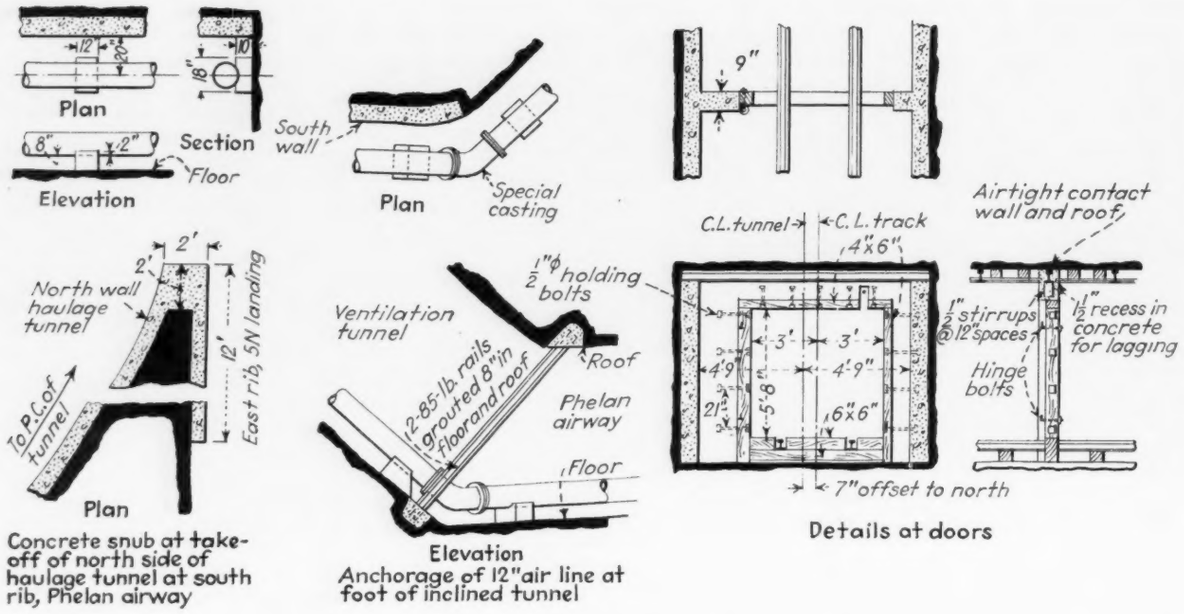
About 450 ft. above the 7-ft. Phelan seam—which to date is that most generally worked under the sea—lies the 6-ft. Harbour seam. No. 2 shaft, driven 850 ft. deep to the Phelan seam, passes through the Harbour seam and in earlier years extensive workings seaward were conducted from this shaft in the latter seam. Later the Harbour seam workings were suspended to permit the workings of the lower seam to advance well ahead and to allow time for settlement of the overlying strata, before advancing workings in the upper seam.

Restoration of the old and caved roadways in the upper seam now is adjudged no longer economically feasible. This fact, together with the general scheme of reallocation of the Phelan seam collieries, led to a proposal to develop the upper seam through cross-measure tunnels and to utilize the roadways to the shaft bottom in the lower seam. The débris from driving the tunnels was stowed in the old standing rooms of the Phelan seam, thus saving the expense of taking it to the surface.

Driving cross-measure tunnels which cross the rocks at an angle is a little more difficult than driving on the pitch of the measures, but no unusual difficulties were encountered in the driving of the two tunnels that connect the Phelan seam workings with those of the Harbour seam above. In order to prevent weathering and to afford support for the roof beams, the sides of the tunnels

Details of doors, compressed-air lines and nosing or "snub" of haulage tunnel.





were lined with 9-in. concrete walls, leaving the tunnels in finished state 12 ft. or more wide in the clear. Total length of main tunnel from Phelan to Harbour seam is 5,400 ft. including the curve at the entry from the Phelan seam and that at the end of the tunnel leading into the Harbour seam.

Old 85-lb. rails are used at 3-ft. centers as "booms" or crossbeams to support the roof. These rest on 9-in. concrete walls. Three-inch lagging was run from rail beam to rail beam; and over the lagging, wood wedges were driven to support the roof.

A 15-ton Goodman trolley locomotive with two 120-hp. motors is used in the tunnel. Hangers for the trolley line are attached to the bases of the cross (rail) beams and hold the trolley wire 6½ ft. above the road rail. Between lagging and floor the height is 8 ft., so the airway, including the space occupied by the rails, ties and cars, is 8x12 ft.

No stoppings are built in the crosscuts, but the concrete lining on either side of the roadway is extended up to the roof, made 12 in. thick and provided with wing walls 2 ft. long extending into the crosscut on either side of the opening. With these walls on either end of the crosscut, no leakage is likely to occur. The crosscut also is filled tightly with waste rock from the tunnel.

These ventilating provisions are necessary now, but will not be so for long, as the intention is to sink, at a point where the measures are still far out to sea, a blind shaft from the head of the projected shoreward workings of the Harbour seam.

Plan and elevation of west end of cross-measure tunnel from Phelan to Harbour seam with standard section of tunnels, crosscuts and manholes. The main tunnel is over a mile long.

The return air will then be taken down that shaft to the Phelan return, and thus it will be possible, by making both tunnels intakes, to increase the cross-section for intake air and entirely eliminate the possibility of leakages.

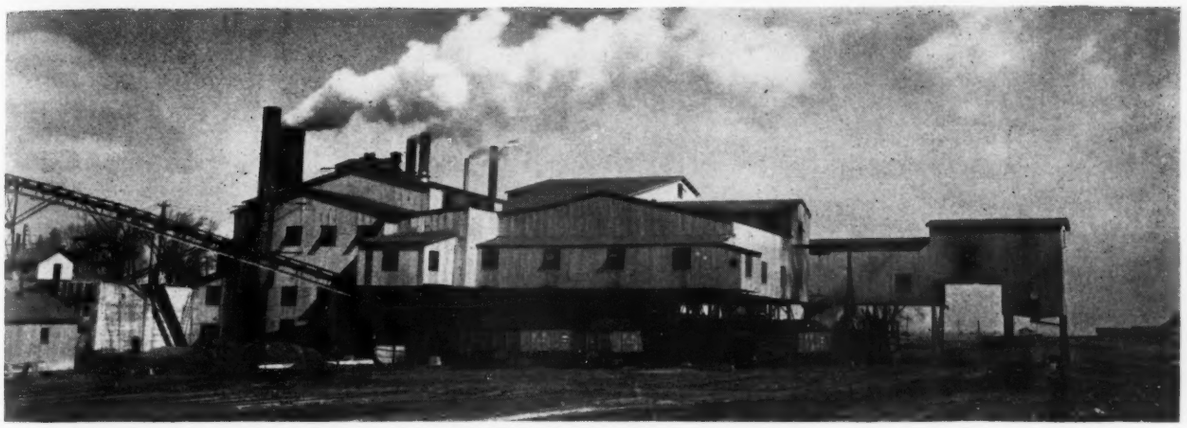
As 12-in. Ventube pipes and auxiliary fans were used to ventilate the tunnels during construction, few crosscuts were driven, these being at 300-ft. centers. Details of the doors at either end of the neutral section of the main tunnel are shown in Fig. 2, as also the means of holding the compressed-air pipes on the steep inclination in the tunnel connecting the Phelan seam with the haulageway. The compressed-air pipe was set 8 in. clear of the floor on concrete saddles 12 in. wide with the center of the pipe line 20 in. from the edge of one of the concrete walls.

In the section of the mine to be worked by rooms, long "headways" (engine planes) will be driven for some distance toward the shore straight up the pitch, and the coal cars will be brought loaded to the landings on these planes at points 1,000 ft. apart. Operation will be on the panel system so that if a fire should start, which is unlikely here (though common in another section of Nova Scotia—Stellarton), it can be isolated promptly.

The geological structure resembles one-half of a very shallow bowl or inverted dome. Along the side of the syncline, the contours will curve in the shape of a semicircle. Planes driven straight up the pitch will diverge from each other as they rise. The Sydney coal field is remarkably free from faults and slips.

As the described development has only recently been undertaken, the levels in the newly won Harbour seam are still of short length and have produced at present only up to 800 long tons per day, mostly from development work in rooms. Later, more locomotives will be added, and the output ultimately will be 3,000 tons daily. By this time the Phelan workings will have been entirely exhausted within the prescribed boundaries of the reallocation scheme. Already the workings of the Phelan seam are 15,000 ft. from the shore line and 18,000 ft. from No. 2 shaft. Two parallel haulage slopes are used to bring the coal to the shaft bottom. The production from the Phelan seam at No. 2 colliery during the remaining life of this mine will be almost entirely pillar coal.

The two collieries lying on either side and contiguous to the No. 2 colliery workings, namely collieries No. 4 and No. 1-B, will extend their workings into the territory previously apportioned to the No. 2 colliery area. Around the worked-out area of No. 2 colliery on the Phelan seam, a strong barrier pillar 500 ft. wide will be left. No. 4 colliery and No. 1-B colliery now operate entirely on the Phelan seam, but at some later date each of these collieries will be connected by tunnels to the Harbour seam above, and the operation herein described will be repeated.



Fiatt preparation plant. The old tipple now is in center, with washing plant behind it and drying plant, with steam coming out of dryer exhaust, at left. Two loading tracks were added at right, along with refuse-disposal equipment.

HEATING AND COOLING

+ Plus Shaking and Squeezing of Coal Characterize Fiatt Drying System

By IVAN A. GIVEN
Associate Editor, Coal Age

Coal drying at the Fiatt (Ill.) operation of the Truax-Traer Coal Co. can be described briefly as removal of water by a combination of mechanical action and evaporation. Mechanical removal results from screen action plus alternate squeezing and loosening of the coal bed on the dryer screens under the influence of a current of heated gases interrupted at regular intervals by a pulsator. Also, these hot gases naturally raise the coal temperature and evaporate part of the remaining water, and this stage, at Fiatt, is succeeded by a cooling cycle in the course of which the heat in the coal finishes the job of reducing the moisture content to the desired level.

THE drying philosophy outlined above was arrived at only after extensive experimentation and consultation with drying authorities here and in Canada, and as yet not all the plant revisions necessary to put this philosophy completely into effect have been made. But the company has in mind replacing temporary cooling facilities with a permanent installation as well as the adoption of provisions for recirculating the heating gases to take advantage of the greater heat-carrying capacity resulting from saturation when the gases enter the furnaces and thus reduce fuel consumption. Also, it is believed that the higher moisture content of the recirculated gases will render them less likely to affect the coal from the standpoint of chemical characteristics.

Drying at Fiatt is an outgrowth of the installation of washing equipment, which, in turn, is a reflection of the Truax-Traer policy of continuous improvements to keep the quality of its product in line with the trend in fuel demand. Washing, of course, improved the quality of the coal, as well as the uniformity of shipments, particularly in the smaller sizes difficult or impossible to hand-pick. But washing also added moisture to the coal and drying therefore was resorted to as a means of preventing an adverse effect on B.t.u. content as well as to save consumers the annoyance of handling frozen coal.

Until last year, Fiatt coal was prepared in an all-steel five-track Morrow tipple equipped with four picking table-loading booms, a mixing conveyor, coarse-coal crusher and recirculating conveyor. In April, 1938, a washing addition designed and built by the McNally-Pittsburg Manufacturing Corporation went into operation. Coincident with the construction of this addition, two extra loading tracks were installed to permit loading seven sizes from 5/16-in. carbon up to 6- or 9-in. lump as well as any desired combinations of these seven sizes. New refuse-disposal equipment also was installed, along with a 30x72 double-roll McNally-Pittsburg sizer ahead of the tipple to control the top size of the lump fed

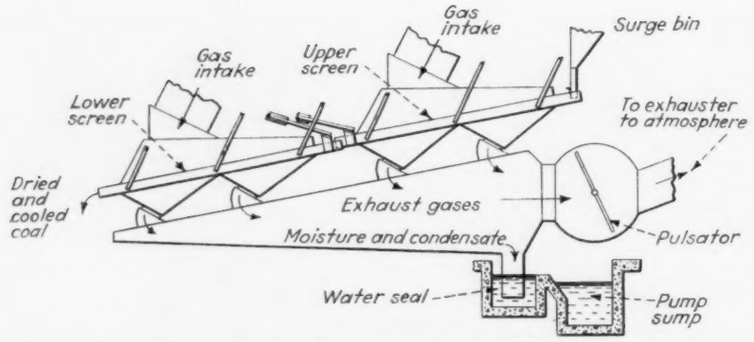


Fig. 1—General arrangement of the equipment in the type of dryer used in the Fiatt plant.

to the plant and also to assist in reducing the plant output in season.

All cleaning of coal from 6 in. down now is done in two McNally-Norton washers, each with a capacity of 250 tons per hour. Hand-picking has been retained as the most satisfactory cleaning method for coal over 6 in. One washer handles 6x2-in. coal from the mine-run screens in the old tipple, while the other cleans the 2x0-in. fraction from the same shakers. Middlings from the No. 2 elevator on the 6x2-in. washer are crushed to minus 2-in. and recirculated to the fine-coal washer. A second crusher also breaks down table pickings containing coal values, which also are run to the fine-coal unit.

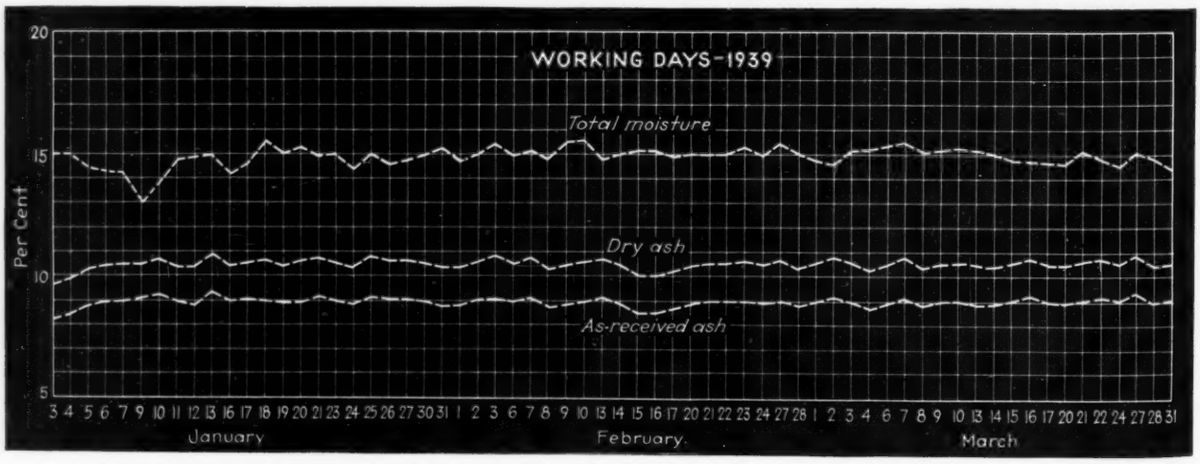
All the washed coal flows with the water onto a shaking classifying screen for separation into the usual sizes down to minus ¾-in. The ¾-in., plus water, is flumed to two sets of high-speed shaking dewatering screens equipped with ½-mm. bronze wedge wire. Each shaker set consists of a pair of 6-ft.-wide screens operating opposed. Each screen is 15 ft. long. Thus, four screens nominally 6 ft. wide and 15 ft. long are available for dewatering. This dewatered coal (¾-in.x½-mm.) now goes to the drying plant, which was started up Oct. 21, 1938.

Fiatt recovers and ships coal from the Fulton County No. 5 seam. Bed moisture usually runs around 14 per cent, with, naturally, some figures above and below. The coal also is porous and consequently offered a difficult problem from the standpoint of dustless treatment with the petroleum products (oil particularly) originally available, which are absorbed almost immediately, even when applied in large quantities. As new products were developed and viscosities were increased, experiments were carried out to ascertain the consumer's reaction, with the result that now H. H. Cross "No-Kol-Dust," an asphalt-base product with a high viscosity, is employed, using the Viking heating and spraying system. This product spreads well on the coal, is without objectionable odor and, in the light of experience to date, provides a lasting dustproofing job. Also, it has been found that about 25 per cent less is required, the usual application being about 3 qt. for coarse coal and 5 qt. for stoker and similar sizes. Incidentally, the present fluid better resists the increased absorptive power of dried coal growing out of both the expulsion of moisture from the pores and a slightly higher than atmospheric temperature, in turn tending to increase the flowing propensities.

As contrasted with the usual bed moisture of 14 per cent, the ¾-in.x ½-mm. coal off the high-speed dewatering screens has a total moisture content of around 26 per cent, the excess over bed moisture being sufficient to result in freezing, in addition to substantially reducing the B.t.u. content. In the drying plant, total moisture is reduced to between 14 and 15 per cent as a general rule. This figure is the result of operation of two major limiting factors, one of which is the B.t.u. content of the dried product and the other is the dustiness of the coal when shipped without oiling, usually the case when loading for industrial consumers. Substantially lower moistures can be, and have been, obtained in the Fiatt plant, but the increased dustiness was objected to by a number of purchasers, with the result that compromise figures were selected.

The original design of the Fiatt drying plant was the work of McNally-Pittsburgh, which also did the building. The manufacturer since has cooperated in experimentation and revision with the coal-company and mine staff, including T. G. Gerow, chief engineer; Byron Somers, superintendent, and O. E. Janes, chief chemist. Rated capacity of the plant is 150 tons per hour and the equipment comprises two McNally-Pittsburg Vissac dryers with storage bins, two stoker-fired heating furnaces with ducts, exhaust fans and stacks, effluent-collecting system and recirculating pump, vibrating screen for sizing the dried coal, temporary cooling equipment, the neces-

Fig. 2—Washing and drying results at the Fiatt plant in the first quarter of 1939. These daily averages are based on sampling the ¾-in.x½-mm. size.



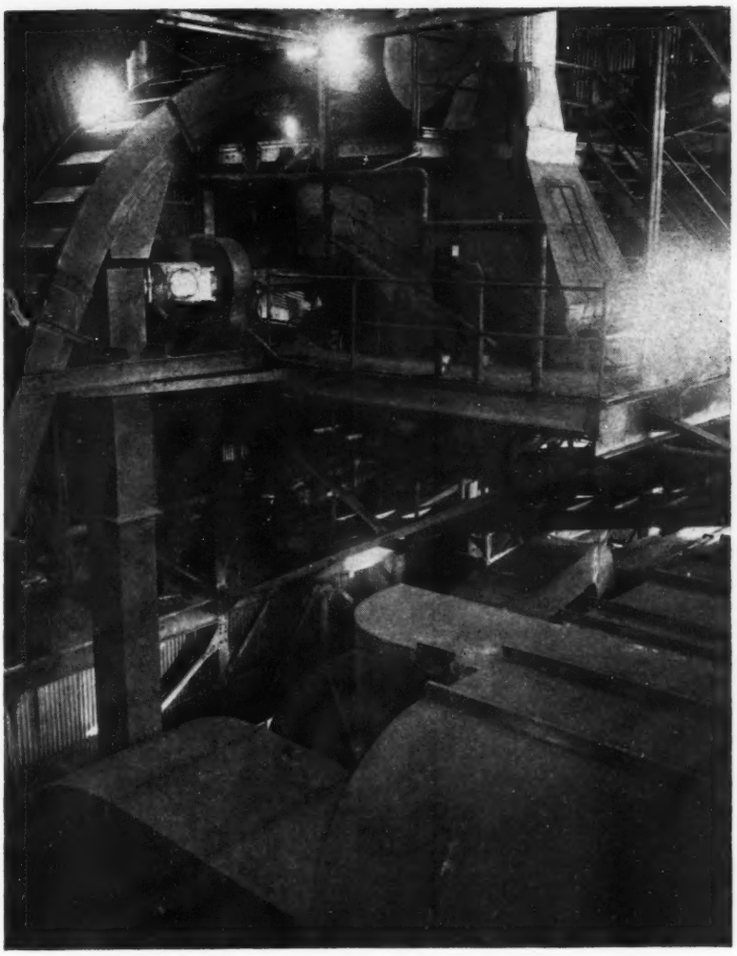
sary elevators and conveyors, and a control station.

Each dryer includes two high-speed shaking screens operating opposed and in balance. Over each screen is a hood connected to the hot-air-duct system, and under each is an exhaust casing with two openings to an exhaust-gas collecting chamber with a sloping bottom to lead free moisture and condensate back to a water seal and pump sump. At the back of the chamber is a rotating blade known as a pulsator, which alternately opens and closes the inlet to an exhaust fan. With the pulsator closed the coal on the screen is free and largely in suspension, due to the screen motion. As the pulsator opens, the hot gases are drawn down through this loose coal bed and the necessary heat transfer takes place. As the pressure builds up, however, the bed naturally compacts, reducing the flow of gases but at the same time exerting a squeezing action until the bed becomes so compact as to prevent the passage of either air or water. Presumably at about this point the pulsator again closes, relieving the pressure for about 1½ screen strokes with a free bed. The cycle, of course, is repeated with the next pulsator opening, but with the bed rearranged, presumably so that removal of additional water during the next pressure interval is facilitated. In other words, it is stated, the pulsator not only permits the use of pressures so high that the coal could not travel if they were applied continuously but also permits rearrangement of the bed, as well as its loosening, to facilitate moisture removal both mechanically and by evaporation.

Screen Speeds Changed

Screen width is 6 ft. and the overall length of the two screens in each dryer is 33 ft. Actual screening surface in each dryer, however, is approximately 5½x25 ft. Screens are fitted with ½- and ¾-mm. bronze and stainless-steel wedge wire. Water and fine coal through these wedge-wire sieves are trapped out into a sump and pumped back to the dewatering screens for recirculation and salvaging of the ¾x½-mm. fraction. Dryer screens originally were operated by crank drives providing 204 strokes per minute (total stroke, 2 in.). These, however, have been replaced by eccentric drives providing 320 1-in. strokes per minute, giving a greater screen lift and higher capacity with, as another result, a greater volume of heating gases through the coal bed.

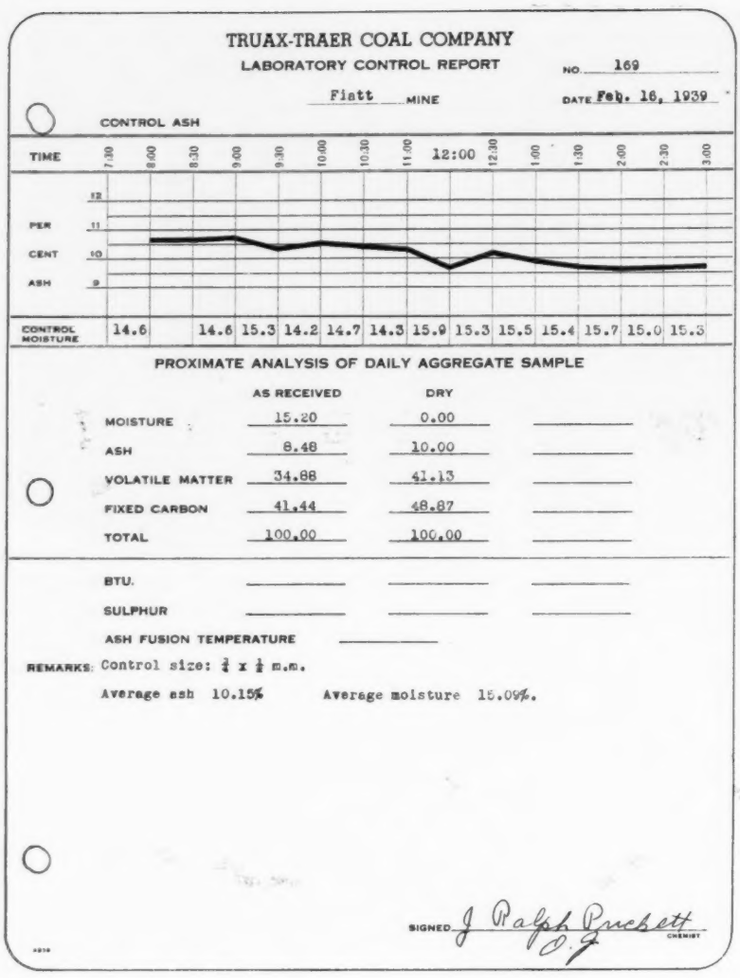
Hot gases for drying are supplied by two Reintjes furnaces each fired by two Firite stokers using dried coal. The gases are pulled down through the dryer screens by Clarage Type 1 No. 120 exhaust fans, which at present expel the saturated gases to the atmosphere. Pulsator speed (each pulsator is equipped with a Reeves variable-speed transmission for speed variation as desired) is 53 r.p.m. at present, producing 106 pulsation cycles per minute, or approximately one pulsation cycle to every three screen strokes.



The cascade chute and exhauster for supplementary cooling and moisture elimination are at the left, with the hood and stack over the vibrating sizing screen at the upper right. The cascade may be eliminated in the future in favor of improved cooling provisions.

Each dryer is preceded by a 25-ton storage bin receiving ¾-in.x½-mm. coal from a conveyor from the dewatering screens. Bins are equipped with "Bindicators" wired to signal lights at the control station so that the operator can tell when he is full up or running out of coal and make the necessary adjustments. The upper screen in each dryer acts as the feeder. A sliding gate on the discharge side of the bin chute can be moved up or down to adjust the depth of the coal on the screens from 3 to 5½ in. in accordance with the rate of output. When the depth of coal is changed, the gas temperature also is adjusted, using the following standard scale as a guide; 3-in. coal depth, 820 deg. F. duct temperature; 3¼-in., 840 deg.; 3½-in., 860 deg.; 3¾-in., 880 deg.; 4-in., 900 deg.; 4¼-, 4½-, 4¾-, 5- and 5½-in., 910 deg. Temperature adjustments are made by regulating the stoker firing rate.

While not originally contemplated to the present extent, the practice at the time this article was prepared was to heat the coal on the upper screen in each dryer and then cool it as far as possible with the equipment as originally designed on the lower screen, at the same time carrying off the moisture expelled during the cooling cycle, following this with supplementary cooling and moisture expulsion after the coal leaves the dryers. Cooling on the lower screen is accomplished primarily by opening to its fullest extent the cold-air



TRUAX-TRAER COAL COMPANY

LABORATORY CONTROL REPORT NO. 169

Fiatt MINE DATE Feb. 16, 1939

CONTROL ASH

TIME: 7:30 8:00 8:30 9:00 9:30 10:00 10:30 11:00 12:00 12:30 1:00 1:30 2:00 2:30 3:00

PER CENT ASH: 12 11 10 9

CONTROL MOISTURE	14.6		14.6	15.3	14.2	14.7	14.3	15.9	15.3	15.5	15.4	15.7	15.0	15.3

PROXIMATE ANALYSIS OF DAILY AGGREGATE SAMPLE

	AS RECEIVED	DRY	
MOISTURE	15.20	0.00	
ASH	8.48	10.00	
VOLATILE MATTER	34.88	41.13	
FIXED CARBON	41.44	48.87	
TOTAL	100.00	100.00	
BTU.			
SULPHUR			
ASH FUSION TEMPERATURE			

REMARKS: Control size: ¾ x ½ m.m.

Average ash 10.15% Average moisture 15.0%.

SIGNED J. Ralph Puckett CHEMIST

inlet in the branch duct to this screen in each dryer.

Under the above system, the temperature of the coal leaving the lower screen in No. 1 dryer ranged from 112 to 140 deg. F. (pyrometer readings) in the period Feb. 13-March 13, 1939, compared with 128 to 148 deg. off the lower screen in No. 2 dryer. Usually, the coal requires about 45 to 50 seconds to travel the length of both screens in a dryer. Other temperature data are given in Table I, which is a summary (highs and lows) of 42 temperature and moisture readings in the period Feb. 13-March 13, this year. It will be noted that the total moisture in the coal leaving No. 1 dryer ranged from 14.22 to 16.58 per cent; No. 2 dryer, 13.49 to 16.09 per cent. Totals over 15 and under 14 per cent, however, were in the minority. And the daily averages in the first quarter of 1939, as shown in Fig. 2, generally were close to 15 per cent.

A substantial part of the moisture reduction, as might be expected, results from the shaking action of the screens plus the squeezing of the coal bed produced by the pulsator. Some idea of the effect of this mechanical action may be obtained from sample results when breaking in the screens without the furnaces in operation. Minus 5/16-in. coal was used for this purpose, and its total moisture content off the dewatering screens was slightly over 25 per cent. Running it through the dryers without the furnaces going reduced the total moisture to about 17 per cent.

For temperature control, eleven thermocouples are employed. Seven of these are in permanent locations, as follows: one in each of the two furnaces, one in the main duct to the dryers, and one each in the four hoods over the four dryer screens. The other four thermocouples can be interchanged between the two dryers and are used to ascertain the temperatures below the screens at four points: the upper and lower ends of the upper screens and the upper and lower ends of the lower screens.

Coal off the dryer screens at the temperatures and total moistures shown in Table I, etc., falls into one side of a gravity-discharge conveyor-elevator. This unit raises it to the upper horizontal run and discharges it into a cascade chute fitted with a series of steps from top to bottom. A 24-in. exhauster pulls air at room temperature up the cascade chute in the opposite direction to the falling coal for still further cooling and moisture elimination. This exhauster discharges to the atmosphere. The coal falls onto the opposite side of the bottom run of the same conveyor-elevator and on its second time around is discharged into a Robins "Gyrex" screen for separation into ¾x5/16- and minus 5/16-in. sizes, which may be loaded separately, in a combination or in mixtures with other sizes. A hood is built over this vibrator with a stack to the atmosphere so that the resultant natural draft will accomplish still further cooling and moisture reduction. As a result of cascading and natural draft, the temperature of the coal is reduced another 20 deg. as compared with the temperature leaving the dryers, while the total moisture is brought down an additional ½ per cent.

Should the proposed additional revisions noted above be made, the cas-

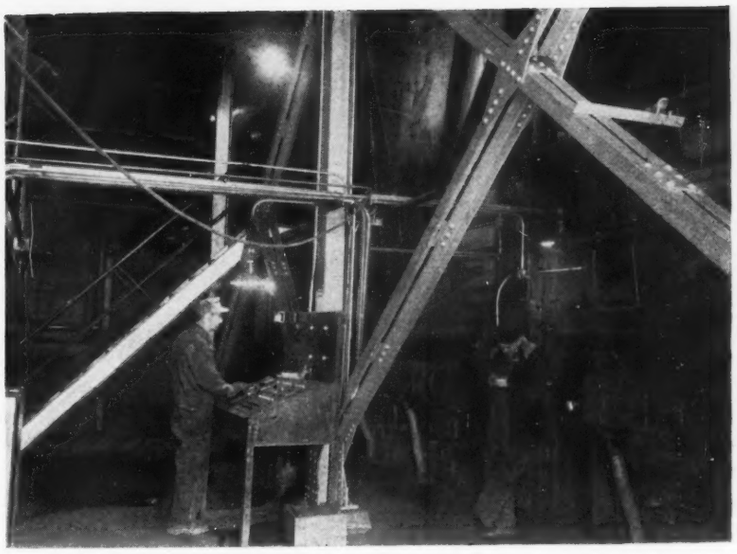
Table I—Summary of Operating Temperatures and Total Moistures in the Dried Coal From Feb. 13 to March 13, 1939, Fiatt Drying Plant

	Temperature Range, Deg. F.	Range, Total Moisture, Percentages, Dried Coal
Gas Temperatures		
No. 1 furnace	900–960	
No. 2 furnace	910–960	
Main duct	890–920	
Over upper screen, No. 1 dryer	810–850	
Over lower screen, No. 1 dryer	220–690*	
Over upper screen, No. 2 dryer	820–860	
Over lower screen, No. 2 dryer	710–780†	
Beneath screens, both dryers:		
Upper end, upper screens	0–40	
Lower end, upper screens	60–90	
Upper end, lower screens	60–80	
Lower end lower screens	40–80	
Coal Temperatures and Moistures‡		
Off upper screen, No. 1 dryer	152–171	14.29–16.64
Off lower screen, No. 1 dryer	112–140	14.22–16.58
Off upper screen, No. 2 dryer	127–164	15.01–17.13
Off lower screen, No. 2 dryer	128–148	13.49–16.09

* Usually 350 to 400 deg. † Steps under consideration to reduce these figures. ‡ In subsequent cooling and moisture elimination, temperature is reduced about 20 deg. and moisture about ½ per cent more than the figures given.

cade, in particular, may be eliminated in favor of cooling and moisture elimination on the lower dryer screens by means of cold-air currents. The same hoods, exhaust casings, exhausters, etc., would be used, except that the lower hoods would not be connected to the hot-gas duct system. Better cooling and dewatering results are contemplated and the rough treatment the coal gets in the cascade and the extra pass around the conveyor-elevator would be avoided. At the same time, provision for recirculating the heating gases for the reasons outlined above is contemplated. With this set-up, the goal would be 14½ per cent total moisture and a temperature of 90 deg. F. in the car.

With the adoption of washing and drying at Fiatt, Truax-Traer installed a complete analytical laboratory and instituted systematic control sampling and analysis. For control purposes, the ¾-in.x½-mm. size was selected on the well-established ground that the finer sizes are more difficult to clean and that, therefore, if they come up to set standards the coarser ones also must conform. And, in the case of Fiatt, this size usually already is dried and therefore may be ground immediately.



Control station in the Fiatt drying plant. The fronts of the two heating furnaces show at the right, with the dryer exhausts in the left background. The operator is taking a temperature reading off the pyrometer scale.

The laboratory and sampling staff consists of a chief chemist, an analyst and a sampler. Samples of the ¾-in.x½-mm. size are taken every half hour and part of each sample is used for an ash and moisture determination, while the last split is added to a composite for the day's run. A complete proximate analysis, including B.t.u. and sulphur, is made of this composite sample, thus giving a complete picture of the day's results. At regular intervals, all prepared sizes are sampled as loaded, as well as the washer refuse and raw coal. These samples are used for float-and-sink tests, and proximate analyses are run on the float fractions.

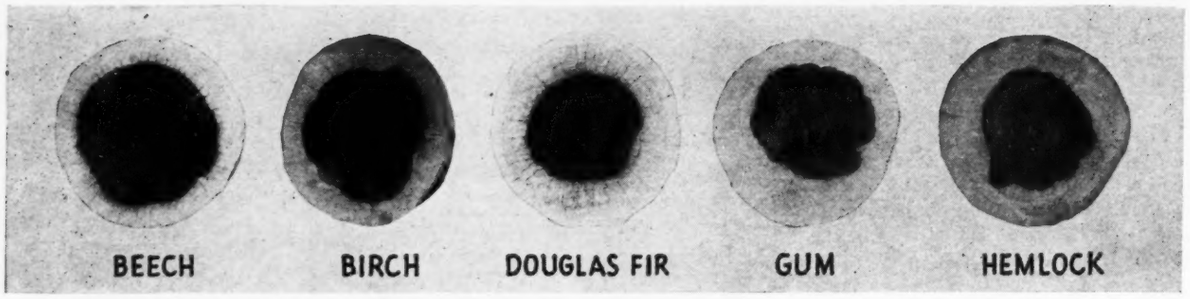
NEW TREATING METHOD

+ Adopted by Several Companies in Alabama Where Pine Timber Is Plentiful

By J. H. EDWARDS
Associate Editor, Coal Age

RELATIVELY low cost of mine timbers cut from Southern or loblolly pine delayed the acceptance of timber treating in the Alabama coal fields, but the increasing labor costs of replacing decayed timbers and the greater safety afforded by sound timbers altered the situation and now Alabama is far in the lead in the use of timbers treated by a process which is relatively new at the mines in this country. This is the "Osmose" process, whereby standard preservative chemicals of recognized efficiency are mixed with a colloid so that penetration to great depth after dipping or brushing green timber takes place by natural phenomena without mechanical pressure or vacuum equipment. Seven Alabama coal-mining companies are now using timber treated by this system.

Osmose preservative compounds consist basically of sodium fluoride in mixture with potassium bichromate and dinitrophenol plus the colloid. Sodium arsenate is added when protection against termites is required. Mixtures containing sodium fluoride have been used in central Europe since 1913. The extent of this use as of 1926 is indicated in a report made that year by George M. Hunt, chief of wood preserva-



Penetration tests on five different woods.

tion, U. S. Forest Products Laboratory, Madison, Wis., to the American Mining Congress. He observed that about 80 per cent of all mine timbers treated and used in central Europe were being treated with mixtures containing sodium fluoride. Wolman salts and Basilit are other examples of the sodium fluoride group.

Approximate percentages of the chemicals making up the Osmose mixture are: sodium fluoride, 78; potassium bichromate, 3; dinitrophenol, 14; and gum arabic, 5. The material is furnished in dry powder form and the mixture is made by adding sufficient water to result in a fluid aqueous paste comprising a solution and a suspension of pasty powder. This wet mixture must be applied to the timber when green, and the more sap in the wood the deeper is likely to be the penetration. For at least 30 days after the timber has been dipped or brushed it must be kept piled and covered to exclude air so as to retard as much as possible the natural drying.

Impregnation takes place by the natural phenomena of osmotic pressure and diffusion, and the sap of the wood is the vehicle for the process. Osmotic pressure is capable of carrying the impregnation to many inches depth. Railroads and public utilities were among the first industries to make extensive applications and service tests of the treatment in this country. In the summer and fall of 1935 the Alabama Power Co. began the treatment of Southern pine poles, and in a paper which appeared in *Electrical World* (Feb. 1, 1936), E. C. Thompson, supervisor of transmission, stated that to that date 600 Southern pine poles 30 to 35 ft. long had been treated.

In that paper Mr. Thompson presented Table I, indicating penetration depths 60 to 90 days after treatment. The test borings were made when the poles were first uncovered from the waterproof paper that had been placed over them to retain the moisture. These poles had been painted with the Osmose mixture immediately after the bark was stripped off the green pole and the work of roofing, gaining and drilling completed. Thickness of coating was regulated so as to result in the use of approximately ¼ lb. of chemical for each cubic foot of wood.

The table indicates that the sodium fluoride penetration was more than 2 in. on sixteen of the poles and was 3 in. or greater on five. Penetration does not necessarily stop when the treated pole is uncovered but may go appreciably deeper. Since that original application, the Alabama Power Co. has installed more than 1,000 additional Osmose-treated poles.

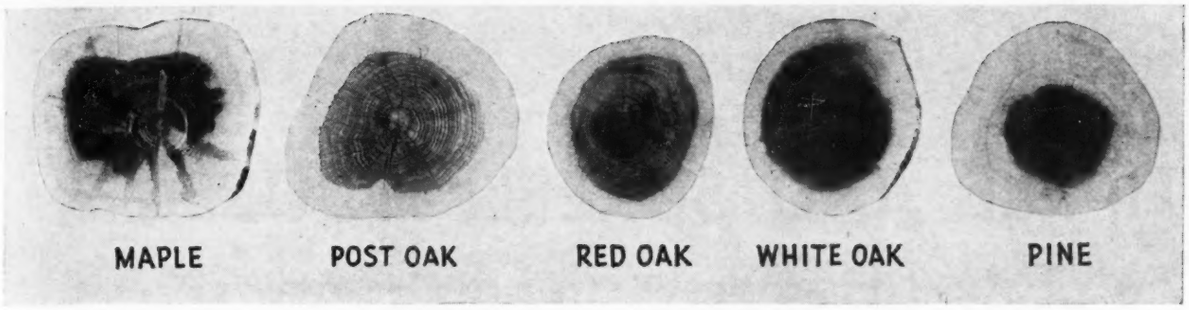
The zirconium-alizarin color reagent test, long used with the fluoride preservatives, is applied to indicate the depth of impregnation. With the exception of the dinitrophenol, which is yellow and whose penetration is visible by that color, the Osmose preservative chemicals are colorless. The color reagent is sprayed on a section that has been cut from the wood which has been treated. Taking increment borings from the wood and dipping them into the reagent for about 30 seconds is another method. Treated portions of the wood turn yellow and untreated show red.

Table I—Initial Penetration, Southern Pine Poles, Inches

Boring			Est. Pole Diam. Where Boring Was Taken	Dinitro Zone Depth	Sodium Fluoride Penetration
Number	Length	Depth to Pit			
1	5¼	3¼	7	¾	1½
2	5	3½	7¼	1	2
3	5½	2¾	6¼	⅝	2¼
4	5	3¼	7	½	2
5	6¼	4¾	10	⅝	2¼
6	6¼	4	8	¼	2¾
7	6¼	3½	7½	¼	2½
8	5¾	3¾	8	¼	2¼
9	5½	3	6½	½	2¾
10	6½	3¼	7	⅜	3
11	6	4	8½	⅜	3
12	5	3¾	8	½	3
13	5¾	4¼	9	½	3
14	5	4	8½	⅝	2½
15	4¼	3¼	7	†	2¼
16	5¼	3	6½	¼	2¾
17	4¾	4¼	9	¼	3½

Out in the timber dipping posts for the Woodward Iron Co. Those in the background are piled ready for covering.

In Dolomite No. 3 mine of the Woodward Iron Co., Osmose-treated Southern pine is being used exclusively for timbering a six-heading aircourse that is being driven 3,000 ft. by conveyor to serve a new section where the coal will be conveyor mined (*Coal Age*, July, 1939, p. 35). Six-inch posts with 4x6x24-in. caps



Penetration tests on five different woods.

are placed on 4-ft. centers. The posts are treated in the field where they are cut and the caps and wedges treated at the sawmill in the field. When it is necessary to cut posts inside of the mine, the raw ends are painted with the Osmose compound.

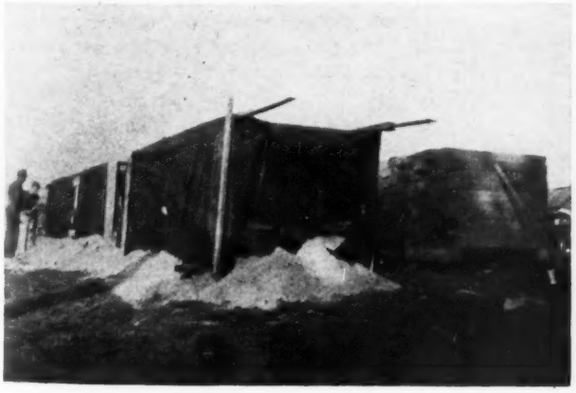
Dipping is the usual method of application of the treatment on timbers within the limit of size that men can handle. Painting or hand-brushing treatment, equally as effective as dipping, is preferred when timbers are long and/or heavy or when quantity does not justify using a tank. Immediately after the application the timbers are bulk piled, without spacing strips, and covered with the waterproof paper to protect the paste from being washed off by rain and to retard the loss of moisture (sap). Fourteen to 90 days, depending on size of timber, is the range of time recommended for this treatment period. Usually dirt, or other suitable material, is shoveled around the base of the pile to prevent circulation of air.

The Alabama By-Products Corporation has applied Osmose protection to mine ties, roof timbers and outside construction lumber. The start was made in 1936, when 1,000 sap-pine ties (6x6-in.x6-ft.) were treated and installed in Barney mine. An inspection of these ties in March, 1939, showed no visible signs of decay. Several thousand more of the treated ties have been installed since the initial batch. At Praco mine of the same company, Osmose-treated ties and lumber were used in rebuilding an approach trestle at the tipple. A river storage bin at Barney mine was refloored in 1936 with treated pine. At Flat Creek and Praco mines of the same company, other applications have been made.

Application by hand brushing is suitable for small batches or for posts or lumber too heavy or too large for hand dipping.

Both ties and outside construction timbers of Osmose-treated pine have been installed by the Brilliant Coal Co. In addition to the Dolomite mine of the Woodward Iron Co., at least three other coal mines of the iron and steel interests have installed treated ties and in some instances oak has been used. Like the pine and other soft woods the harder woods must be treated soon after cutting and immediately after sawing or peeling.

In 100- to 900-lb. lots the treating powder costs 50c. per pound, with transportation charges added from the Buffalo plant of the Osmose Wood Preserving Co. With the recommended ¼ lb. of powder per cubic foot of wood, or 21 lb. per thousand board-feet, the cost of materials, including waterproof paper, for treating 1,000 board-feet is approximately $11.00. Likewise material cost for treating a post 6 in. in diameter and 8 ft. long will be as low as 17c.; for a 4x6-in.x6-ft. tie, 10½c.; and for a 6x8-in.x8-ft. tie, 21½c.



To retain moisture while osmotic pressure is "doing its stuff," piles are covered with waterproof paper and banked with dirt.

Mixing a new batch of the paste during the treatment of ties at the Barney mine of the Alabama By-Products Corporation.

TIPPLE AND SCREEN HOUSE

+ Erected by Shawmut Mining Co.

At Brandycamp, Pa.

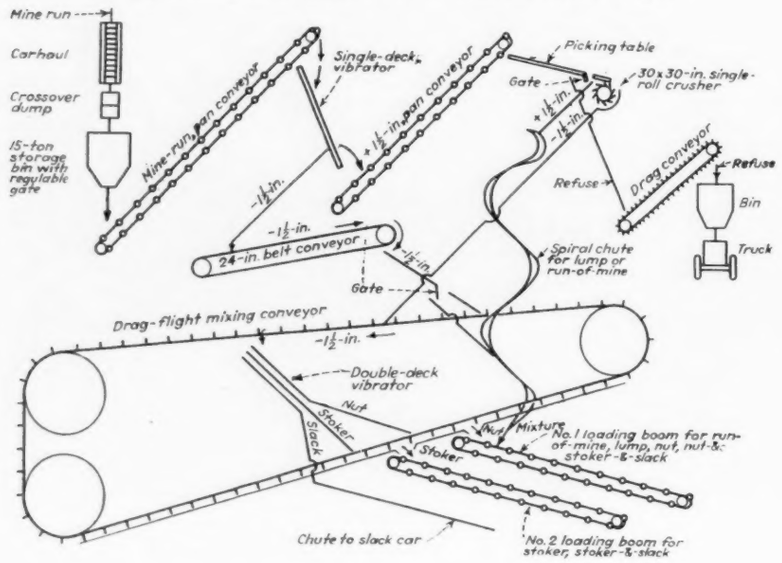
TO PREPARE coal from the Middle Kittanning measure, at Brandycamp, Elk County, Pennsylvania, and to replace a structure burned down on the evening of Feb. 7 of this year, the Shawmut Mining Co., with headquarters at St. Marys, Pa., has erected a new tipple and screen house which, while it exhibits some divergences based on the management's experience with the somewhat earlier construction, largely follows the same lines.

Exploration and laboratory tests in the summer of 1934 demonstrated the excellence and regularity, at this location, of the Middle Kittanning coal and in consequence a tipple was erected and a mine in that seam developed. In catering to the requirements of an exacting and critical market, for most of the coal enters the domestic-stoker trade, it became apparent that existing preparation and screening facilities were wholly inadequate; hence, in the summer of 1937, a screen house was constructed to size and prepare coal for the consumer's requirements.

After these improvements had been made the demands for tonnage were such that it became difficult to develop the mine fast enough to satisfy the demand. Production increased steadily and consistently throughout the year 1938, and the tipple worked overtime to supply the coal needed for a rapidly expanding market. The fire of Feb. 7, which broke out in the scale house, destroying both tipple and screen house, thus came at a difficult juncture. To care for such trade as could use mine-run coal, a temporary tipple with a cradle dump was constructed in four days' time, and the mine continued in operation on a basis of 1,000 tons daily.

Mine cars are pulled over the tipple scale by a Jeffrey car haul at the rate of six cars per minute. Thence they are run one by one by gravity to a Phillips crossover dump, where the coal falls into a 15-ton bin introduced to prevent time losses whenever (1) the machinery must be shut down in tipple and screen house because railroad cars are being dropped, (2) rock is passing through the tipple or (3) dumping is otherwise delayed or interrupted.

Diagrammatic sketch showing flow of coal, Brandycamp tipple.



Small Coal Bypassed

Flow of the coal from this bin to a primary pan conveyor is regulated by the opening of a gate in the bottom of the bin. The conveyor elevates the coal to a primary single-deck 5x10-ft. Robins vibrator which in turn screens out the minus 1½-in. coal. This latter product is carried by a 24-in. Republic rubber belt to a mixing conveyor which runs at right angles to the conveyors. In this way the minus 1½-in. coal bypasses a crusher, which will be described later.

The plus 1½-in. coal passing off the upper deck of the primary vibrator is elevated by a 36-in. pan conveyor to a picking table on the top floor of the screen house, where four slate pickers working under a General Electric mercury-arc lamp remove refuse and tramp iron. The refuse is thrown into chutes and slides to the lower floor, where it falls onto a drag conveyor by which it is elevated to a bin where it is dropped into trucks and hauled to a refuse pile. Lump coal, after passing the picking table, falls into a 30x30-in.

Jeffrey single-roll crusher, whence it passes to the mixing conveyor.

However, if mine-run is desired, this cleaned plus 1½-in. coal is intercepted by a gate between picking table and crusher and passes down a spiral chute which deposits it on the tail end of No. 1 loading boom. To provide the smaller sizes in the run-of-mine reassembly, a gate also is thrown in the slack chute and minus 1½-in. coal is diverted from the mixing conveyor to the tail end of No. 1 loading boom, both arriving at the same point at which the plus 1½-in. discharges.

Coal is handled on both top and bottom of the mixing conveyor, which is of the drag type. Normally, coal from the crusher unites with the minus 1½-in. coal from the belt conveyor, which is of about the same size, and travels along the top strand to a 6x14-ft. double-deck Robins vibrator which makes a final and efficient separation into nut, stoker and slack (usually minus ⅜ in.)

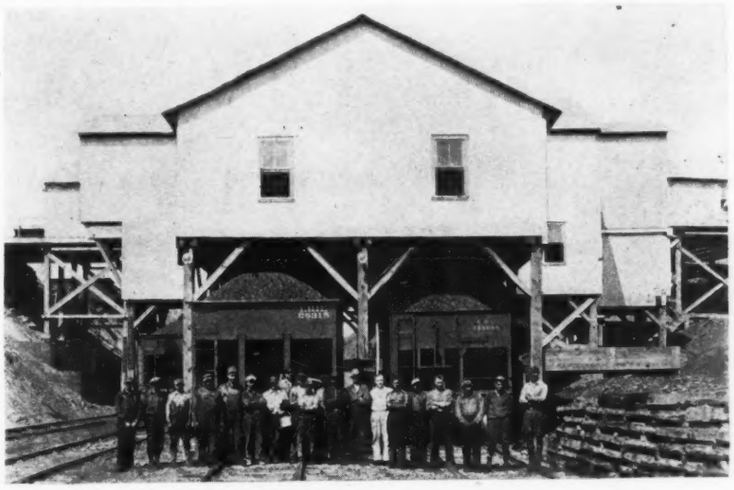
Nut and stoker discharge at different points on the lower strand of the mixing conveyor and are carried by it and discharged at their respective loading booms. By gates located in the chutes and by slides inserted at the openings under the lower strand of the mixing conveyor, any mixture of sizes can be provided. By regulating the slides any percentage of slack or stoker coal desired can be mixed with other sizes.

Loading booms are of pan-conveyor type, 36 in. wide; hoods are placed at the discharge end to confine a dustproofing mist of Coalaid; the liquid from which the mist is formed is piped during the summer months under a 200-lb. pressure. In the winter that pressure will be increased. This mist lays over the coal a fine coat. Only when the consumer desires such treatment is it applied to the coal.

Mercury Floodlights Used

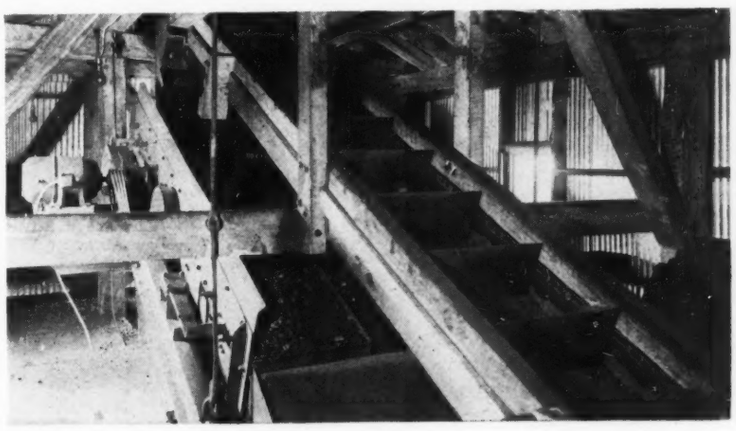
Whether the coal is or is not sprayed, the hoods of the loading booms drag the coal to a uniform height so that the cars are trimmed to a level top. In addition to the four pickers on the picking table, three are employed at the approach to the nut or lump boom and three in the nut or lump railroad car. At both places mercury floodlights are provided to aid the pickers, who, particularly on dark days, need such assistance.

A General Electric magnet is hung over the 24-in. rubber belt which carries the minus 1½-in. coal from the primary vibrator to the mixing conveyor. This effectually removes all tramp iron, however deeply buried. Experience has shown that such a magnet should be energized by a reliable source which will not lose current by the sudden kick-out of a circuit breaker, thus dropping an accumulation of tramp iron. This might occur if the magnet received its current from the regular mine line, so it is energized instead by a small motor-generator set. Domestic stokers with small worm feeds are likely to be incapacitated if care



Operating force at Brandycamp tipple.

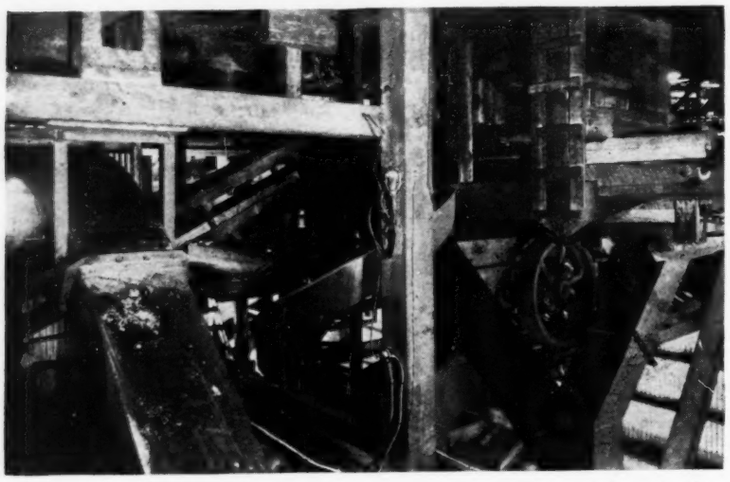
Lump conveyor, belt conveyor, picking table, mercury-arc lamp, tail-end mixing conveyor, refuse conveyor and chutes.



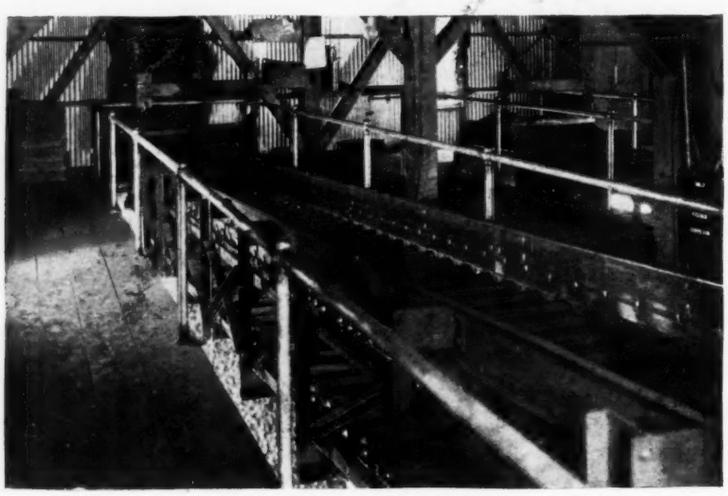
Double-deck vibrator and top strand of mixing conveyor on top floor.

is not taken to remove every piece of tramp iron.

Remote control is provided throughout for operation of the screen house. From his station before the control board, the tipple boss can stop and start any unit by pressing a button; he also can observe the loading of cars and watch the flow of coal on the loading booms. The primary conveyor that carries the coal from the storage bin below the dump up to the primary vibrator is equipped with a variable-speed motor. If the tipple boss notices a run of wet coal, he can slow his feed immediately by changing the motor speed of the primary conveyor.



Spiral chute, refuse conveyor, auxiliary refuse conveyor, tail end No. 1 loading boom, slack chute to mixing conveyor and No. 1 loading boom and tail end of mixing conveyor, all on bottom floor.



Boom house and loading booms.

Pump house and storage vault for chemicals used to coat coal.

Railroad cars are handled under the tipple by Brown-Fayro car retarders operated by an attendant from a platform erected between nut and stoker tracks. This man also handles the loading booms and has charge of the slate pickers in the railroad car. The force consists of a tipple boss, weighboss, checkweighman, dumper, scaler, checkman, trimmer, tipple motorman, car-and-boom handler, car dropper and ten slate pickers. Hand screens corresponding to the screen sizes on the double-deck vibrator are part of the tipple equipment, and periodically the product is tested to determine size consist.

Tipple Built in 52 Days

Construction is of timber and galvanized iron; timber was used because it was available on the lands of the company. However, as the work was pushed so that the tipple was erected in 52 work days of eight hours each, it was necessary to purchase some timber. Peter F. Loftus, the consulting engineer of the company, made the schematic drawings and specifications; E. P. Danridge Co., the detailed drawings and machinery purchases, and R. R. Brown, chief engineer of the company, was construction engineer.

Seam thickness runs from 25 to 28 in., and, because the roof has a weak gray shale or sandstone top that is none to secure, room widths are restricted to 27 ft. Pillars are 13 ft. wide, some portion of each being recovered. Face headings occur at 320-ft. centers, and rooms are 240 ft. long. Headings are driven 6 ft. high, or 5½ ft. above the rail, and 10 ft. wide. No gob is provided in roadways. Haulageways and airways are separated by 25-ft. pillars.

Though some steel cars with a capacity of 2,200 lb. have been installed and more will be provided later, most of the equipment consists of wood cars, holding 1,100 to 1,600 lb., depending on type of construction. Output is about 1,000 tons daily and coal is available for another quarter century. In some of the streams may be found small deposits of "sulphur mud" (ferric hydrate) which have been deposited by the mine water. This is being sold for 25c. a ton to a factory at Kersey which loads, trucks and finally processes it into red pigment. F. D. Lambert is general manager of all the operations of the company.

VENTILATION AIDED

+ By Providing for Solid Pillars Between Intakes and Returns

By ANTHONY SHACIKOSKI
Foreman, Cochran Coal Co.
Salina, Pa.

• Ventilating efficiency can be materially affected by the mining plan employed, although it is not the complete answer to the problem. But if the plan is drawn up, for example, to eliminate all stoppings between main intakes and returns, a big step in the right direction has been taken. How this was accomplished in one case, with the object of getting the most out of the ventilating unit, is the subject of this article.

STOPPINGS — instrumental in the establishment of air currents—also can be a detriment. Under certain conditions they become leaky and in case of a mine explosion they are blown out, and restoration of air currents is slow, due to the necessity for reconstruction. Some are blown out by large falls, others by heavy shooting, and care always must be taken to keep stoppings in very good shape if good fan efficiency is to be obtained.

The plan of mining herein offered is based on driving a main entry made up of six headings. The center two headings, which also are the intakes, are driven with temporary stoppings in the crosscuts until far enough ahead for turning a South Dip or a North Main. After these cross mains are turned and cut into the main returns, and overcasts are installed, the temporary stoppings are taken down and used in further advancement of the main headings. Solid pillars (see Fig. 1) are left between the intakes and the double returns—one for the South Dip and the other for the North mains—on either side. But crosscuts equipped with temporary stoppings are made in advancing each double return the same as in advancing the main intakes. Once the returns cut through to the next South Dip on North mains, however, the stoppings are removed, leaving two return headings on each side of the double intake. The object of turning the South Dip mains close to North mains is to help the haulage motors, as signal lights may be installed more easily to direct the haulage unit to either the south or north side for loaded trips and thus eliminate waiting.

When driving the main entry the two main intakes are driven in the lead with the returns following. Thus, the pressure is taken off the returns. The long solid pillars of coal also protect the roof in the main returns, where protection is needed most, inasmuch as bad roof in main returns is a very troublesome thing and is detrimental to ventilation. The North and South Dip mains should be turned at about 2,000-ft. intervals; and this means doors. As doors are the biggest cause of loss of air, they should be built very carefully and, in addition, air locks should be used.

Under the old plan of mining, butts were turned both ways (north and south) from the mains, which ran east and west. About five butts were turned on each side, half of them going to the dip with the pressure of the main air current on the doors resulting in a loss of about 50 per cent of the air and an insufficiency at the face of the main. An air-lock door had to be built at each butt entry, whereas under the new plan only one air-lock door takes care of all the butts on each main.

Not only did the air improve under the new plan but our cost for power for pumping and haulage was cut. Under the old plan each dip butt had to have a pump and pipe line. Under the new plan only the main goes to the dip and only one pump is needed instead of four or five. Formerly, also, there always were two or more motors pulling heavy loads out of the dip entries at the same time, pulling down the voltage and running up the demand peak, with resultant excessive cost for power. But under the new plan butts are driven to the raise and the main haulage motor takes care of the heavy load up the main dip entries, thereby making it unnecessary to overload the gathering locomotives. As a result, armature or motor troubles from overloading have practically disappeared.

The North and South Dip mains are driven to permit eliminating stoppings. The air is carried to face of each main and then goes on through the workings on the split to main returns. This put the strongest force of air to the farthest part of the mine. The double intakes shown in Fig. 1 are used for main haulage and travelingways and, as noted above, are paralleled by solid pillars, except at each South Dip and North Main entry. At each of these overcasts are installed and air is carried to the South Dip and North faces by left and right aircourses equipped with Doors *A*, which lock the air so that only one door is needed to keep it locked at all times.

As a North or South Dip main advances the air-lock door is moved close to the face. But Door *B* at face of the South Dip or North

mains must have a weight on it to hold it closed, for whenever a door is opened in any butt entry the air has a tendency to short-cut and push Door *B* open, making air lock between Doors *A* and *B* ineffective. In some cases, a latch catch is used to hold Door *B* shut. This, of course, is an easier way and best for strong pressures, as a heavy weight makes it harder to open the door. This applies to butts also.

The first two rooms on each butt are cut through to the next butt or the main returns, leaving a solid block of coal between the intake and return on both the South Dip and North mains. The air works its way to face of each butt in the split and then goes to the main returns. These solid pillars of coal between returns and intakes are not only an efficient way to ventilate but are a great protection to the mains from squeezes which may develop in worked-out areas. Also, the pillars are very easily recovered in final retreat out of each section.

When turning North and South mains, care must be taken to determine the quantity of coal to be worked and number of men necessary, after which air requirements are figured and air-lock doors are used to keep the air continuously in motion. In other words, fresh air is cheap, but only on the outside in the open. Inside of the mines it is a most valuable thing and is the vital factor in production, for men with fresh air to keep them active get greater results from their efforts and thus benefit both themselves and their employer. Working is safer, also, if the air is conducted to the faces to carry off, after diluting, all gases.

The direction butts are to be turned off the South Dip and North mains is determined by the elevations and is such that rooms are driven to the raise. Thus men are not compelled to work in water; water yardage is saved, and the coal is not submerged so that it cannot be prepared. Inspection of Fig. 1 will show that the butts on the North mains are started closer to the main entry than on the South mains. This was done to keep the rooms going to the raise. By the same token, rooms on the butts off the South Dip mains go the same direction as rooms off the North Main butts.

Ventilation is often discussed at various mining institutes, and very interesting and educational papers are read. But, when summed up, they all point to one thing: airtight stoppings and aircourses free of obstructions. Very seldom, however, is a method of actually doing this job offered. In aircourses that are to be kept open and free of falls, levels should be run and the swamps graded so that water accumulations will not choke the openings. Where bad roof is encountered it generally is taken care of very well while track is in the aircourses. But usually the track is removed after the aircourses are driven, and years later, after timbers have decayed and air has acted on roof, the falls come. In these places preparations sould be made before the track is taken out. Gob holes should be driven into the pillars and kept open so that if a fall does come in an airway these gob holes can be used to store the rock and slate. Thus, the aircourses can be kept open and some of the expense and time of laying track to clean up falls can be saved. Or, if it is intended to lay track for this purpose, the gob holes may be used as temporary storage spaces, thus getting the fallen material out of the airway and thereby reducing the time the ventilating current is handicapped.

Years ago we were ventilating with a forward-curved-blade centrifugal fan, using a 50-hp. motor. The farthest working place was only 1¾ miles back from the opening, yet we had less than 6,000 c.f.m. on one split, due to so many doors, stoppings, developing leaks and falls in aircourses. Today we are ventilating with a Robinson backward-curved-blade fan driven by a 25-hp. Westinghouse two-speed motor drawing 6 hp. when operating at slow speed. It is four miles back to the farthest working place in the mine, which is on two splits, with the mains the farthest back and with 10,000 c.f.m. in each split and more at the return ends. Fan water gage is 1.9 in. When slowed down and drawing 6 hp., the fan produces between 4,000 and 5,000 c.f.m. in each split. However, the fan is run at slow speed only on idle days when no power is on in the mine. The gob holes in the aircourses are an obstruction to the flow of air at high velocities. But they repay once we get a fall.

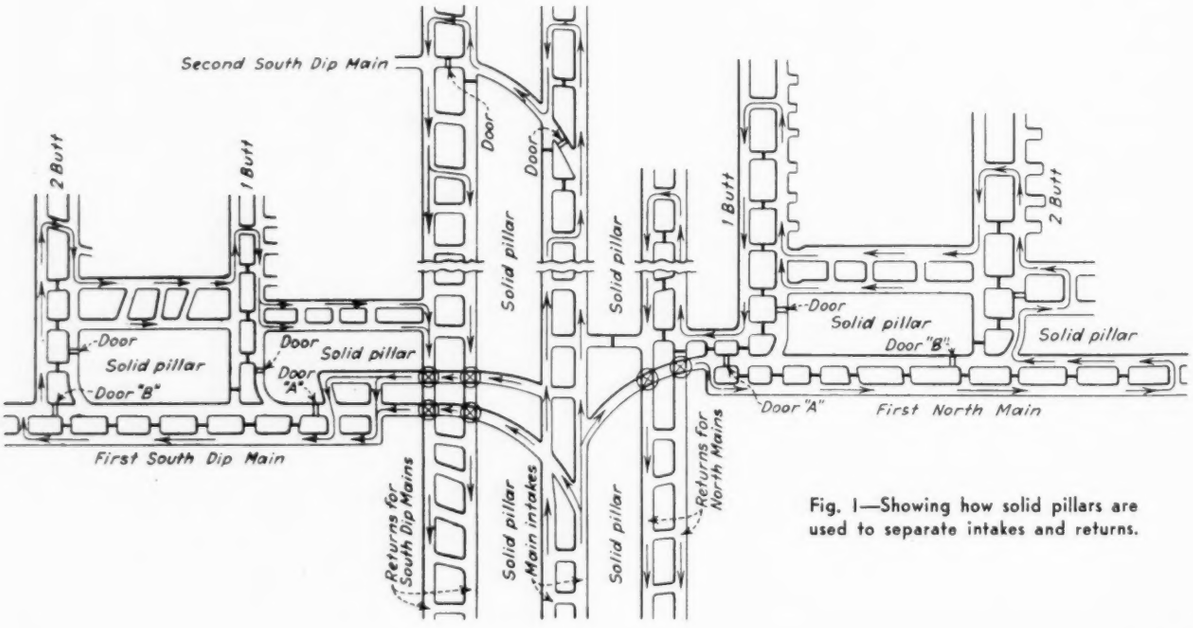


Fig. 1—Showing how solid pillars are used to separate intakes and returns.

THIRD OF THREE ARTICLES ON STEEL SUPPORTS IN MINES

EUROPE USES STEEL

+ For Shaft Linings and Buntons

By Dr. R. G. WUERKER
Consulting Engineer
Manila, P. I.

SUCH striking advantages have arisen from the use of steel as a roadway support that it has been increasingly favored for application to main and blind shaft linings, especially on the Continent of Europe, where colliery shafts usually are cylindrical. Rectangular shafts ceased to be sunk after 1900, because the coal measures usually are covered with several hundred feet of younger beds composed mostly of clay and quicksand. Heavy pressures result which can be borne only by that strongest of structures, the ring. Linings must be both strong and watertight. Colliery shafts on the Continent of Europe, therefore, are lined mostly with brickwork, reinforced concrete, or cast-iron tubbing with flanges either on the outer or inner face.

However, the caving of two of these tubbing-lined shafts has shown that the danger is not in the radial pressure or in the tensile stress caused by unequally distributed compressions but in the torsional forces arising from movements of the quicksand or in similar combined stresses.

To meet these the thickness of the webs or flanges has been increased from its former value of 6 in. up to 12 in. As a further means of strengthening the shaft walls, reinforced concrete has been placed behind the tubbing. Where this was considered inadequate, two concentric tubbing rings were placed and the space between them was filled with reinforced concrete. By this means the thickness of the lining was further increased 10 to 20 times.

Kusenberg proposes tubbings made of plates and angles of high-tensile steel disposed much as in the hull of a vessel. In this manner, the buckling strength of the shaft could be greatly increased, but I have not heard that this suggestion actually has been followed (Fig. 1).

A further increase in the strength of such a shaft lining has been effected by using cast steel instead of cast iron for the tubbing, for the strength increases in proportion to the compressive strength of the two materials. However, up to the present, only one shaft has been lined with cast-steel tubbing.

At a shaft sunk by the Honigmann process, a modification of the Kind-Chaudron method for loose ground, the shaft was walled with rings formed of channels about 11.8 in. deep and of a weight of 92.4 lb. per yard. They were built in single or double rings, and in the latter case the space between the inner and outer rings was filled with concrete, a construction similar to that already mentioned, which was composed of two tubbing rings.

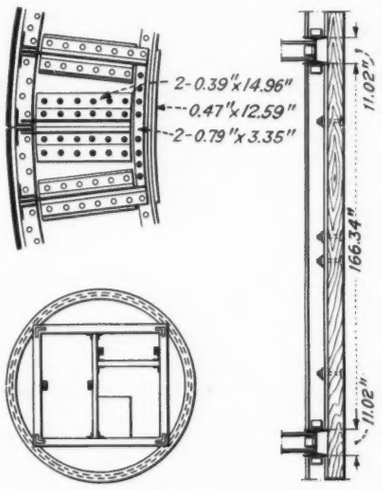


Fig. 1—Steel shaft lining, 1¾ in. thick. Fig. 2—Steel rings with inserted buntons making a rigid frame. Fig. 3—Guides strengthened by H-beams.

Blind Shafts—The satisfactory results obtained with steel rings in roadway support favored their use also for blind, staple, or underground shafts or slopes. The linings of such passageways formerly were formed by a rectangular framework of timber or steel in sections, divided into two rectangular compartments, one for a cage with counterweight or for two cages and one for a ladderway.

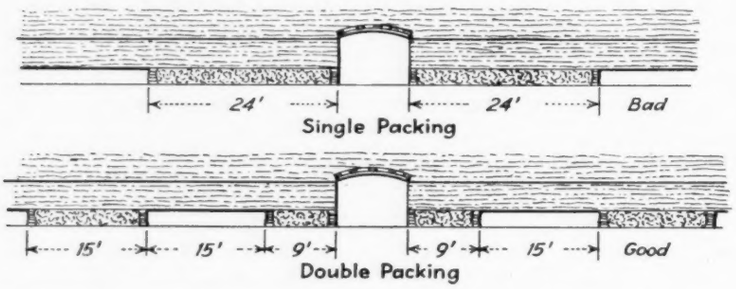
When, with these methods of construction, it was proved impossible to withstand the extreme pressures, the lining was made of standard steel rings such as had been used for roadway support. A further increase in strength can be effected by inserting the rectangular steel framework sets and buntons in the steel ring, making thereby a rigid frame of considerable strength (Fig. 2).

Buntons—Steel sections can be used for buntons in shafts lined with brick or concrete. The quantity of steel built in for this purpose varies considerably, 320 lb. per yard being the minimum, 1,700 lb. the maximum, and 1,010 lb. the average. All shafts equipped with steel buntons and recently constructed come close to the minimum value.

Costs may be saved by increasing the distance between buntons and strengthening the vertical guides so as to increase their resistance to buckling. The strength of these guides alone determines that distance. In some cases, where rails were used as guides, it has been made as much as 19 ft. However, because of the still uncertain action of safety catches on steel rails, wooden guides are preferred. Nevertheless, by combining them with steel posts (Fig. 3), clearance distances up to 14 ft. have been provided without detriment (See *Glueckauf*, March 3, 1935, p. 234; *Colliery Guardian*, March 29, 1935, p. 571).

Notes . . . FROM ACROSS THE SEA

DURING the year 1937, British mines were supplied with 147,000 hard hats, making a total of 435,000 for the last three years, but some are replacements of older types. During the year 40,000 pairs of gloves were supplied to one area alone. Three types have been found necessary. One firm has supplied over 100,000 pairs of safety shoes to British mines. Non-flammable celluloid goggles are being replaced by goggles with safety glass. Leather-mask goggles with ventilated raised eye cups are preferred. Shin-guards have made headway. One firm has sold over 25,000 pairs of kneepads to British collieries. In Scotland, loose pads inserted in pockets at the trouser knees are still popular.



Double packing with smaller packs at roadway reduces roadway roof trouble. Would not the same apply to pillars where these are left in place of packs?

FOR suppression of coal-dust explosions, powdered common salt has been suggested by the Safety in Mines Research Board of Great Britain, which finds that though sodium chloride dissolves in the moisture it draws from the air at 70 per cent humidity, at lower humidities it tends only to cake. In comment, it may be said that, as some British mines are warm and dry, perhaps pulverized salt could be used in them, and it might be quite helpful in the mines of our arid West, where, incidentally, salt is readily available.

Mixed with 20 per cent of finely ground talc (French chalk), precipitated chalk (whiting) or coal, its tendency to cake is generally reduced and is entirely prevented by the use of 10 per cent of tricalcium phosphate or 5 per cent of magnesium carbonate *levis*.

[In a communication of date June 7, Prof. R. V. Wheeler, director, S.M.R.B., says: "Magnesium carbonate *levis* sometimes goes under the trade name in this country of *magnesia alba* and is a light precipitated basic hydrated magnesium carbonate. We have obtained supplies of the material from three different sources and they have differed very little in composition which corresponds closely to $5MO.\ 4CO_2.\ 5H_2O$.

"The physical properties of the material vary according to the method of precipitation, and the cost varies widely. The cost of the material used by us for experimental work was about £2.10.0 per hundredweight" ($208.93 a short ton). "Material of such high quality is not necessary for the improvement of dusts used for rock-dusting in coal mines, and manufacturers of rock dust in this country are putting down plant for the preparation of light forms of precipitated magnesium, calcium and mixed carbonates which they hope to market at a cost of about £3 per ton" ($12.54 per long ton). "We have tested one such product and found it to be nearly as effective as the more expensive material for improving the dispersability of limestone dust."]

Equally good results, says the S.M.R.B., were obtained, and more cheaply, with only 2 per cent of magnesium carbonate and 20 per cent of talc or precipitated chalk. Half-ton batches of these mixtures have been stored for six months without caking in a building at the Buxton Research Station, says the sixteenth annual report of the S.M.R.B.

Tests have been made of the efficacy of the mixture of salt with talc and magnesium carbonate to suppress, under standard conditions of test, an explosion of Silkstone coal dust in the 4-ft.-diameter gallery at Buxton. This salt mixture, so fine that 80 per cent passed through a 200-mesh I.M.M. sieve, was found to be even more effective than salt of similar fineness used alone; when 17½ per cent of the mixture was added to coal dust, it suppressed flammation, though 22½ per cent was needed when the salt alone was used; yet the calculated efficacy of the salt present in the mixture is about ten times that of shale.

Where used in atmospheres of relative humidity above 70 per cent, some substance much less soluble in water than sodium chloride is required. Compounds of the halogens—fluorine, chlorine, bromine, iodine—with the alkali metals are found to possess the most marked power of any to "inhibit" the combustion of coal dust and almost all of them are very soluble in water. Sodium fluoride is an exception, and laboratory experiments show it to be more efficacious in suppressing a coal-dust flammation than any other tested, except the iodide, which is equally deadening.

[*The Oil, Paint and Drug Reporter* quotes whiting at $12 to $22 per ton; magnesium carbonate at 6¼c. per lb.; talc at $11 to $20 per ton and calcium phosphate, tribasic, at 6.35c. per pound. Sodium fluoride cost about 7c. per pound. For coal, pulverized anthracite, which is not explosive, probably might be used.]

To judge by other studies of the S.M.R.B., distribution of support in longwall appears to be important. In one case (see illustration, upper cross-section) the main gate was supported by a single pack 24 ft. wide on either side of that roadway. The roof gave much trouble even when timbered by 6x5-in. girders, either set on wood posts or set into the packs on the side of the roadway. Single and double herringbone timbering were tried and finally cambered girders. No support seemed to give satisfaction.

So it was decided to put two packs on each side (see illustration, lower cross-section), each pair having no greater aggregate width than the single pack had. Whereas each support was 24 ft. wide with a single pack, the two packs on each side with the double pack were 9 ft. and 15 ft. wide respectively, and they were built so as to leave a clear space of 15 ft. between them. The 9-ft. packs were built on either side of the gate, and the 15-ft. packs were erected further out in the gob, so the support—or should it be stated as the resistance?—was greatest in the remote packs and not at the roadway. After the change, the roof of the gate showed a marked improvement, probably because thereby the weight was removed from the vicinity of that roadway.

Height reduction was less marked and more uniform and at 750 ft. from the face was 3 ft. less than with the single-pack roadway. With neither system of packing was there any appreciable decrease in width of the road until the face had advanced 120 ft.; thereafter, a reduction was observed each week. At a point 750 ft. from the face the width reduction was 15 in. more in the single- than in the double-pack roadway.

A natural tendency would be to concentrate the support at the roadway, but that was proved to be only a way of causing trouble, causing the opening to become lower and narrower and disturbing the alignment of the belt conveyor. Does this suggest that pillars alongside an entry (frequently termed "wing" or "barrier" pillars) should be bigger, as indeed is

● Salt, recommended for use as rock dust, is mixed with other substances to prevent caking and increase efficacy. Main supports placed near a roadway defeat their own purpose. Spring draft gear reduces locomotive peaks. Noise in mines is being reduced. Hard hats, gloves, safety shoes, goggles, shin guards and knee pads are correct mine apparel in the British Isles—S.M.R.B. Annual Report.

customary, than the chain pillars provided between the several headings in an entry? It usually is thus provided because of economy in the driving of crosscuts and because, with small chain pillars, time in entry advance will be saved, but there may be the advantage herewith suggested that the weight will fall on the pillars remote from the roadways and maintenance will be reduced.

R. Dawson Hall

On the ENGINEER'S BOOK SHELF

Requests for U. S. Bureau of Mines publications should be sent to Superintendent of Documents, Government Printing Office, Washington, D. C., accompanied by cash or money order; stamps and personal checks not accepted. Where no price is appended in the notice of a publication of the U. S. Bureau of Mines, application should be directed to that Bureau. Orders for other books and pamphlets reviewed in this department should be addressed to the individual publishers, as shown, whose name and address in each case are in the review notice.

Fundamentals of Combustion in Small Underfeed Stokers, by C. A. Barnes. Bituminous Coal Research, Washington, D. C. Technical Report No. 4, 69 pp., 6x9 in.; paper. Price, 50c.

This product of the Fuel Research Laboratory of the Battelle Memorial Institute declares that, even with continuous operation, the burning rate of coal and coke in a small underfeed stoker varies in different parts of the fuel bed, as is evidenced by changes in temperature and gas composition which continually oscillate back and forth past some equilibrium value. Combustion does not center symmetrically around the retort center. At all normal air rates, an excess of air passes through the front of the retort, the center has a deficiency, and the rear usually is similarly circumstanced. Gases from these latter areas are in part combustible, and space in which to burn them must be provided.

When coke is being burned, temperatures in the center of the retort range from 3,000 to 3,100 deg. F., which is above the fusing point of the ash of most coals. Pittsburgh coal is hottest in the center of the retort; Millers Creek, in a ring around the center. In both instances, the temperature normally runs only from 2,400 to 2,800 deg. F. Removal of the finer sizes from caking coals does not affect materially their burning characteristics so long as operation is continuous.

The Nature and Origin of Coal and Coal Seams, by A. Raistrick and C. E. Marshall. English Universities Press, London, England. 282 pp., 5½x8¾ in.; cloth. Price, $3.04.

An interesting review of the geology of coal, confined, however, largely to the British coal seams and referring solely to the Carboniferous series, in which almost all British coal seams appear. In this country a majority of the coal, whether the average coal man realizes it or not, is of other geological periods, though the Carboniferous measures are the source of the greater part of the national coal product. However, the reader, after he has passed lightly over the pages of "The Strata of the Coal Measures," which is wholly British, and not accompanied by a quite necessary map, will come to sections which he greatly would regret to miss, much of them original and suggestive, and illustrated by photomicrographs of British and American coals.

The reviewer was delighted to find the passage: "All the characteristics [of underclays], both physical and chemical, can be correlated with those of an old soil on which grew the vegetation now represented by the coal seam, the changes being brought about by the abstraction of some mineral substances by plant activity and the leaching of others by the passage of water charged with organic acids arising from the decay of vegetable material." It has been the reviewer's contention that the vegetation of the coal beds could not have subsisted on beds of clay, particularly if the surface material was almost pure silicate of alumina, as it eventually became and now is, and that the coaly material made the clay and not clay, the coal. This passage contradicts the statement repeatedly and thoughtlessly made by many generations of geologists that the underclay explains the origination of the vegetal growth from which coal was derived.

What the authors term the "rhythmic unit cycle," and which we term "cyclothem," is emphasized, but without reference to a possibility that in a degree the coal may have had a part in creating the rhythm, but that matter is more debatable. Durains, cannels and bogheads, the authors believe, are allochthonous—that is, have been washed in and not developed in place.—R. Dawson Hall.

Royal Commission on Safety in Coal Mines Report. British Library of Informataion, New York City. Cmd 5890. 520 pp., 6x9¾ in. Price, $2.15.

This report makes several recommendations, among them that inspectors of mines, like factory inspectors in Great Britain, be given training on appointment possibly in the research stations at Sheffield or Buxton and receive lectures from senior and specialist members of the inspectorate and from the research staff; also, that the supervisor of "machinery gear and mechanical apparatus" at a colliery, though appointed by the manager of the mine, shall be required to hold a certificate for appropriate qualifications.

It recommends that where surveyors without a high-grade certificate are employed, check surveys be made at certain stages by and under the supervision of a surveyor having such certification. Both shall assume statutory liability for the accuracy of the surveys. Frequent indorsement of the Holland committee's report, without detailing the terms of that report, make the recommendations of the Commission somewhat difficult to ascertain unless the earlier publication is available.

Expansion of Coal During Coking, by H. S. Auvil, J. D. Davis and J. T. McCartney, U. S. Bureau of Mines. R. I. 3451; 21 pp., mimeograph.

In this report are recorded tests made with slot and sole test ovens into the expansion of coal during coking, which the authors find would not change significantly if the apparatus were enlarged to full oven scale, as results are in substantial agreement in the two types of ovens when carbonizing conditions are comparable. Verticality (as in the slot oven) or horizontality (as in the sole oven) of the plastic layer does not influence the extent of coal expansion so long as the gas is allowed to follow its normal paths in escaping from the charge.

After coal is put into the oven it may shrink and, though it has formed bridges between the walls, those bridges will be broken and the coal will slump, or "squat," and then, when new bridges are formed by expansion and coking, the coke will be unable to expand up into the free space above the charge; thus dense coke will be formed and severe pressure will tend to push over the oven walls.

Fibre Cores for Colliery Winding Ropes, by J. E. O. Mayne. Safety in Mines Research Board. Paper No. 102, British Library of Information, New York. 32 pp., 6x9⅝ in. Price, 30c.

Jute, a fiber derived from the stem of a plant, is relatively soft, weaker than the fibers from leaves and lacking in durability under damp conditions. Leaf fibers, like manila, New Zealand and sisal hemps are better suited than jute for rope cores. Of hard fibers, says the author, New Zealand hemp seems to be best because of its high resistance to compression, its capacity for retaining lubricant and because it has a smaller and more evenly distributed acidity than manila hemp.

Presence of a thin batching (softening) oil reduces capacity of rope core to hold lubricant, and it is suggested a soap solution should be used instead. Asphaltic lubricants are preferable to petrolatum, petrolatum-asphalt mixtures or soap-thickened grease because more completely retained in the core. Strength of manila fiber is reduced by heating in oil, and temperature of bath should not exceed 230 deg. F., at which temperature strength is reduced 20 per cent. Instead of oil, synthetic resins were used in the cores, reducing moisture and corrosivity. Acidity was unaltered, but fiber became brittle and had no tensile strength, making it unsuitable for spinning.

OPERATING IDEAS

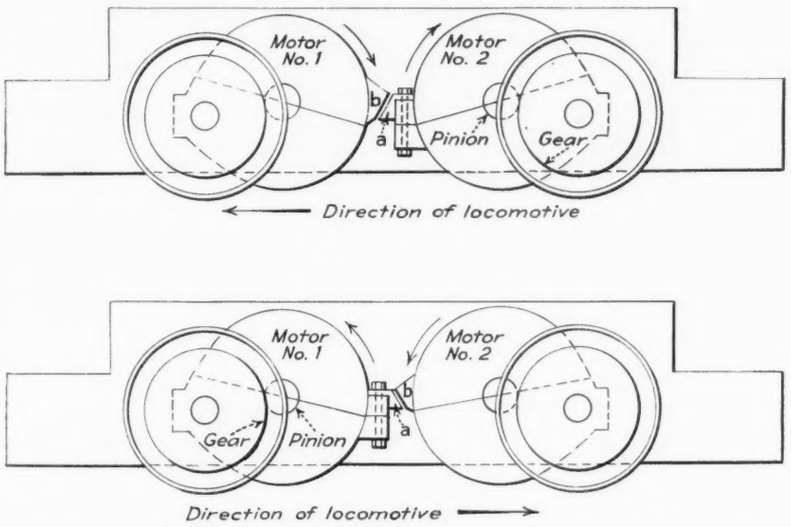
From

Production, Electrical and Mechanical Men

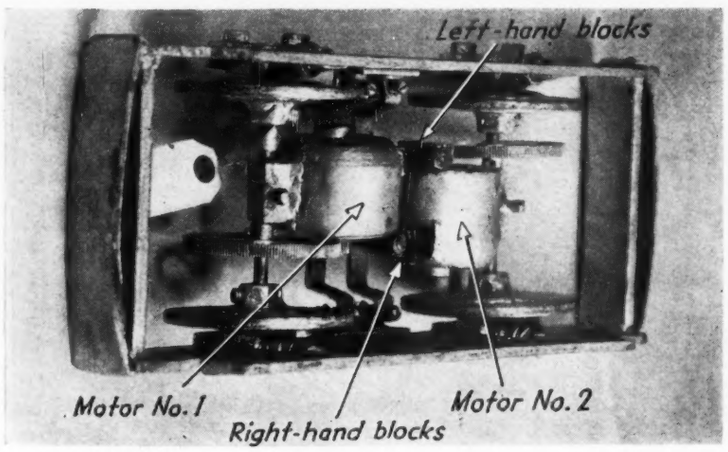
Opposing Forces Harnessed To Cut Haulage Hazard

Since June, 1938, there has been in use on locomotives in the Dora mine of the Harwick Coal & Coke Co., near Greensboro, Pa., a new safety motor suspension which prevents the motors falling or rising in case of a suspension-bar failure. According to C. W. Gibbs, general manager of coal operations, the attachment "has proved very satisfactory." The safety suspension also reduces the strain on the regular suspension bars and frame fastenings so that there is less chance of their failure. A locomotive model fitted with the new device won for John R. Jones, of the Harwick organization, one of the twelve $10 awards in the Miners' Exhibit at the Cincinnati meeting of the American Mining Congress.

The suspension is applicable to locomotives with central-hung motors. As indicated by arrows on the accompanying drawing, there is a tendency for motors to rotate about the axle. Advantage is taken of the opposite directions of these rotative forces by adding steel blocks with beveled contact faces to the motor cases so that the forces are made to counteract each other. As shown in the drawing and photographic illustration, a block, *a*, is bolted to the left side of motor No. 2 and another block, *a*, bolted to the right side of motor No. 1. A block, *b*, is welded to the left side of motor No. 1 and another block of the same designation welded to the right side of motor No. 2 Mr. Jones has applied for patents covering this safety motor suspension for electric locomotives with central-hung motors.



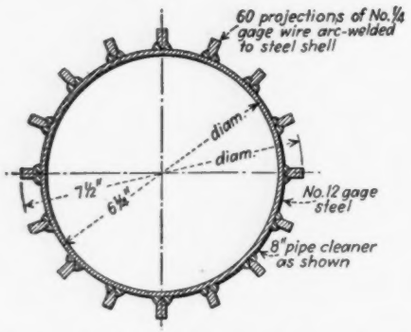
Showing use of blocks on right-hand (top view) and left-hand (bottom view) sides to hold motors.



This model was exhibited at Cincinnati.

Cost of Pipe "Go-Devil" Cut by Arc-Welding

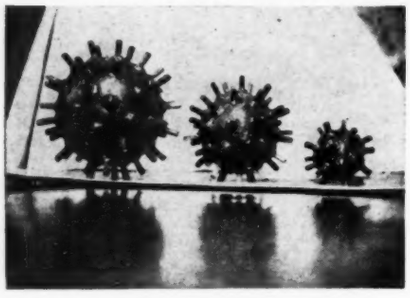
Among the several applications of arc-welding to mine-drainage problems is the fabrication of "go-devils" for cleaning out pipe lines, says Paul F. Erch, mechanical draftsman, Glen Alden Coal Co., Scranton, Pa., in a paper receiving honorable mention in the $200,000 Award Program sponsored by the James F. Lincoln Arc Welding Foundation, Cleveland, Ohio (*Coal Age*, October, 1938, p. 90). "Acidulous mine water, on exposure to fresh air or light, or following a change of temperature," says Mr. Erch, "sometimes will throw down a precipitate of sulphate of iron and other materials colloquially known as 'yellowboy.' This precipitate does not go back into solution readily and therefore tends to build up a deposit on the insides of pipe lines, sometimes seriously restricting their carrying capacity. This deposit usually is not very hard but it is quite dense. The device, in three sizes, shown in the accompanying illustrations, is called a pipe cleaner or 'go-devil'. It is put into the clogged discharge line from a pump at a point just beyond the check valve, after which the pump is started. The force of the water flow causes the cleaner ball to roll forward and seat



Section through steel arc-welded "go-devil."

itself like a poorly fitted valve against the ledge of 'yellowboy.' The effect of the water cutting around the ball, plus the scarifying effect of the teeth, causes this poor seat to be rapidly cut away and the ball then rolls ahead. The process, of course, is continuous and sometimes very rapid, and the cleaning job usually is done very thoroughly.

"A cleaner generally is about ½ in. less in over-all diameter than the inside of the pipe. Other types of cleaners have been used which embody a turbine, or rotating-cutter, principle, the cutter being revolved by the force of the water flow. The design shown, however, has several important advantages. By proper construction, selection of materials and proportioning, it can be made slightly buoyant yet strong, watertight and wear-resisting. The buoyancy is of value when cleaning upward in a vertical or steeply pitched line, as the cleaner does not fall away from its work as a heavier-than-water type of cleaner might do; also, this type of cleaner can



Three sizes of arc-welded "go-devils."

negotiate sharp turns or elbows where a more cylindrical type would have to be taken out and reintroduced beyond this obstruction.

"As to the construction, it is quite apparent that arc-welding plays a very important part in that it allows the assembly of a hollow thin-walled ball of steel by welding together two forged or press-formed hemispherical cups. This method of assembly is inexpensive, light and watertight. Likewise, it is a simple matter to arc-weld the projections or teeth in place in a light though strong manner. These teeth may be made of a very hard material, if desired, for long wear. The forerunner of this type of cleaner was a wooden ball studded with large nails with their heads cut off. The nails, if sufficiently large and numerous, may split the wood ball at the outset or at least later on if ever it be allowed to dry."

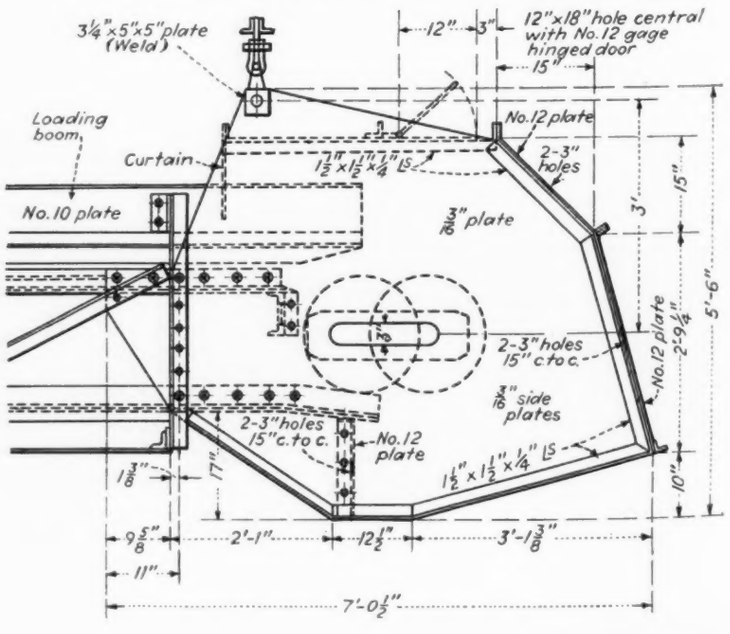
"Go-Grease"

The success of the machines developed by one designer, builder and racer of airplanes is attributed to the use of plenty of "Go-Grease," which might be described as the application of practical knowledge and horse sense to the problem of attaining most efficient performance. "Go-Grease" is a useful article around coal mines, too, and well off is the operating, electrical, mechanical or safety man who has plenty on hand. The Coal Age Operating Ideas Department is one good way of keeping up your stock of "Go-Grease." Likewise, it is the place to pass on some to the other fellow. So let's have your ideas on putting "Go-Grease" into the equipment and activities around your mine. Each idea should be accompanied by sketches or photos if they will help to make it clearer. For each acceptable idea, Coal Age will pay at least $5.

Coal-Spray Hood Installed On Loading Conveyor

For coating coal with Coalaid at Brandycamp (Pa.) mine of the Shawmut Mining Co., the hood illustrated was installed on the end of the pan conveyor, or loader, in accordance with the design of E. P. Dandridge Co. The 3-in. holes are used for the insertion of metal spray nozzles attached to double-strength galvanized iron pipe carrying the liquid to be sprayed, which is under a pressure of 200 lb. in mild weather and even more during winter months. The general framework of the hood is of $1\frac{1}{2}$x$1\frac{1}{2}$x$\frac{1}{4}$-in. angles with 3/16-in. side plates and No. 12 end, top and bottom plates. The hood has a width of 2 ft. $10\frac{1}{8}$ in. between side plates. A 12x18-in. door in the top of the hood gives access to its interior. This arrangement has proved entirely satisfactory.

Showing installation of spray hood on end of loading conveyor.



Motorman's Job Made Safer By Using Spring Frogs

Spring frogs for trolley-wire turnouts have not been applied to an appreciable extent in coal mining but there are places where their use may contribute to greater safety. An Ohio Brass Type S spring frog has been installed at each end of a passing track on the main haulage at Dolomite No. 3 mine of the Woodward Iron Co., Dolomite, Ala. Its use allows the motorman to pass through at full speed without rising from his seat to guide the pole and thus eliminates that chance of hitting his head on the trolley-wire guard.

Top view, indicating spring-frog construction.

Standard frogs accurately installed and held rigidly eliminate, theoretically, the necessity for guiding the pole, but in practice this condition seems difficult to maintain, especially for unfailing passage at full speed. The halftone, showing a motorman bringing out a trip, includes the spring frog at the outby end of the passing track. Construction of this frog,

Coal once mined is literally a liability until it reaches the surface. It's *in* the way until you get it away. Haulage interruptions and delays mean lower production, higher costs, lower profits. Faster haulage, more continuous service, keeping coal moving from face to tipple speeds up production . . . and that's how Exide-Ironclad Batteries are paying profits to mine operators.

When mine locomotives are equipped with Exide-Ironclad Batteries, the coal comes through because Exide-Ironclads "come through" with the dependable power they're built to deliver. Their amazing reserve power makes light of heavy loads and tough grades. Their sustained voltage maintains good haulage speeds, hour after hour, shift after shift. The ruggedness of their construction assures that dependability that means minimized interruptions in haulage. Their trouble-free long life means fewer replacements and more economies.

Isn't it easy to understand why there are more Exide-Ironclads used in underground service than all other makes of batteries combined? Write for free booklet, "The Storage Battery Locomotive for Underground Haulage."

Exide
IRONCLAD
BATTERIES
With Exide **MIPOR** Separators
"MIPOR," Reg. U. S. Pat. Off.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

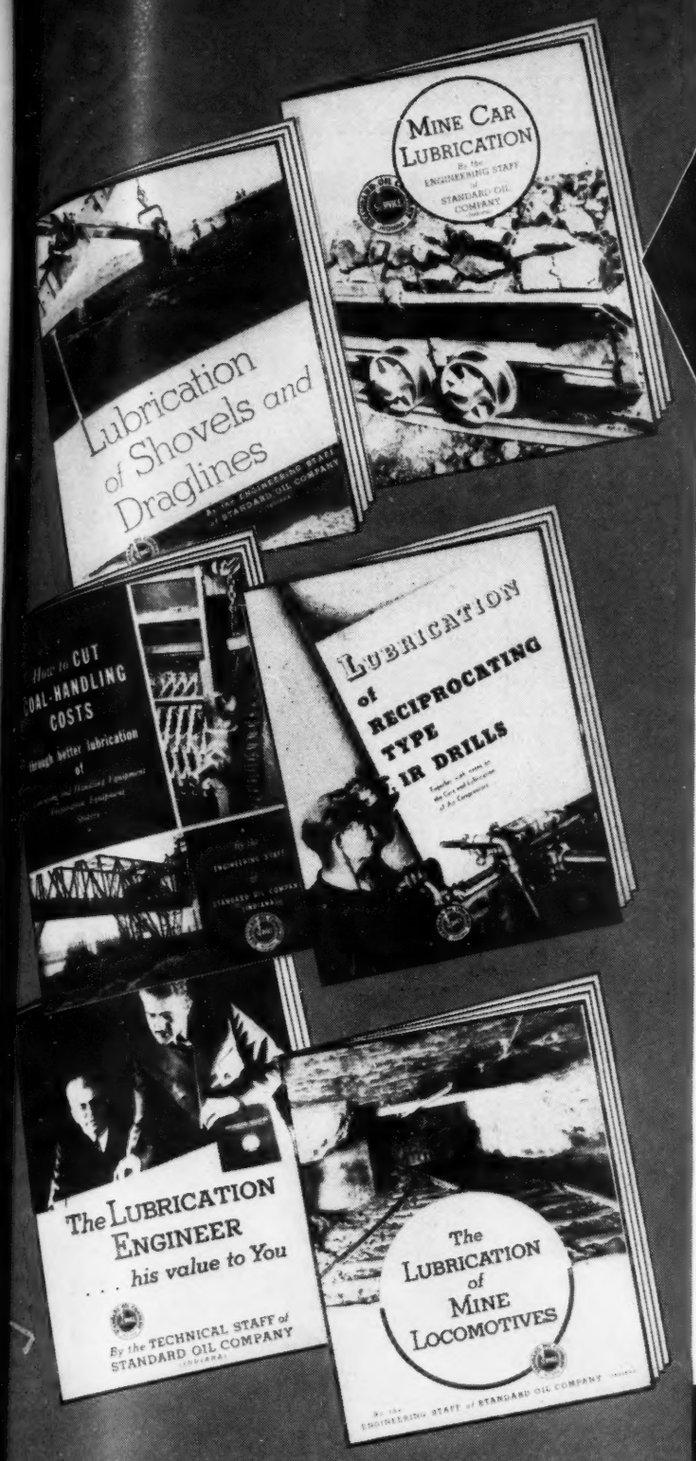
Use of spring frogs has made the motorman's job safer.

a 12-deg. right-hand type with deflector adjusted for turnout positive, is indicated by the sketch.

Portable Floodlights Assembled From Discarded Reflectors

From discarded reflectors lying around the mine the portable floodlights shown in the accompanying illustration were made by Lyman Ellrick, chief electrician.

These handy lights use old reflectors and ¾-in. galvanized conduit.



THESE FREE MONOGRAPHS

. . take but a few minutes to read . . . may give you many money-saving ideas

● LOWER haulage costs—higher tonnage—more lubrication with less lubricant—these and many more "musts" for mine operators have all been solved by closer attention to the lubricants and methods of lubrication used.

The booklets illustrated here give some tips on lubricating mine equipment. They are brief and to the point—just suggestions that you might be overlooking on the care and lubrication of the equipment covered.

If you have a special lubricating problem, the booklet, "The Lubrication Engineer—His Value to You," explains how these Engineers work and why they can frequently help find the cause of lubricant waste and high maintenance.

If you operate in the Middle West, check the monographs you want and tell us where to send them.

SEND THE COUPON

STANDARD OIL COMPANY (Indiana)
910 South Michigan Avenue, Chicago, Illinois

Gentlemen:

I am located in the Middle West. Please send me the booklets checked:

- ☐ "How to Cut Coal-Handling Costs."
- ☐ "Lubrication of Reciprocating Type Air Drills."
- ☐ "Lubrication of Shovels and Draglines."
- ☐ "Mine Car Lubrication."
- ☐ "Lubrication of Mine Locomotives."
- ☐ "The Lubrication Engineer—His Value to You."

Name .....

Company .....

Address .....

City ..... *State* .....

FIRST IN SERVICE
50 FOR FIFTY YEARS
STANDARD OIL (IND.)

STANDARD OIL COMPANY

(INDIANA)

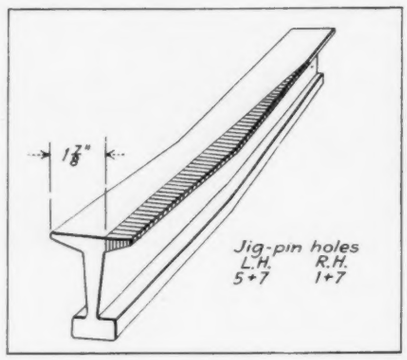
LUBRICATION ENGINEERING

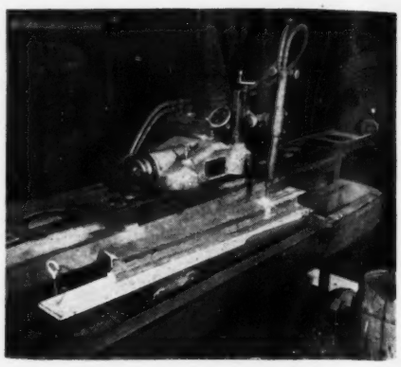
Hickory Grove Coal Mining Corporation, Sullivan, Ind. The floodlights are designed for use in the pit or at any other point on the property where a breakdown may occur. The frames are made of ¾-in. galvanized conduit and the lights are equipped with about 30 ft. of Tirex cable. Just behind the reflector in each case is a duplex receptacle to permit connecting up a drill or other tool; also a wing nut for tilting the reflector as desired. One light commonly is used at the mine-run hopper at the preparation plant, where trucks dump at night to fill the hopper for next day. The lights also are used in the garage for repairing trucks, etc.

Flame Cutting of Switches Cuts Cost in Half

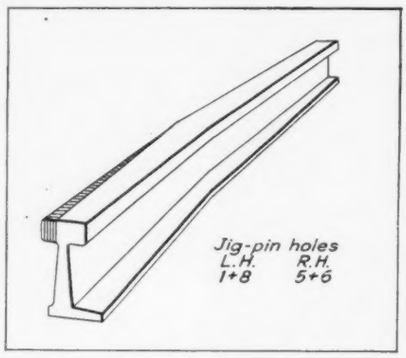
Using a portable oxyacetylene cutting machine, costing about $400 at the time of purchase several years ago, the Consolidated Coal Co., operating several mines in Illinois, cuts 30-lb. switches at approximately half the cost of new switches. Switches for 60- and 40-lb. track also are made with this machine, with the exception that they are more or less custom jobs, while the manufacture of 30-lb. switches has been placed on a production basis by the use of a jig to position the rail lengths automatically for the various cuts. All 30-lb. track is laid with No. 3 frogs; all 40- and 60-lb. track with No. 4 frogs. Frogs, particularly for 30-lb. track, likewise are made in the shop by using the cutting machine to shape the points and then welding the various parts to a steel baseplate.

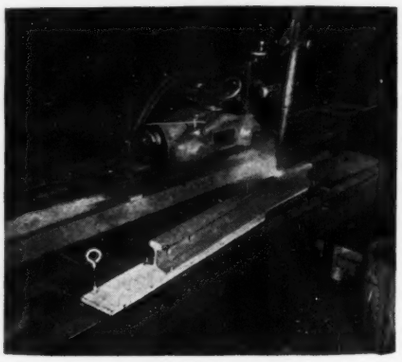
The jig used in cutting 30-lb. switches, as shown in an accompanying drawing, consists essentially of drilled top and bottom plates and the necessary accessories. The bottom plate is set in the cutting bed and the top plate is placed on it so that it can pivot around a pin in the bottom plate. At the opposite end, pinholes in each plate permit positioning the rail, which rests on the top plate, for each of the five cuts. This is done by aligning the pinholes in the top and bottom plates, after which the top plate is held in position by a pointed ¼-in. pin 5 in. long.



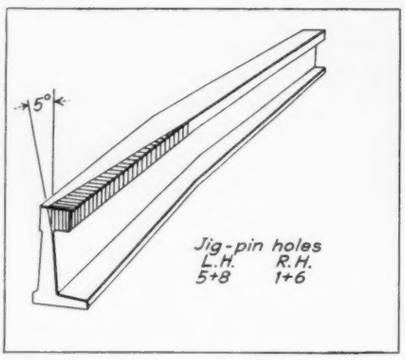


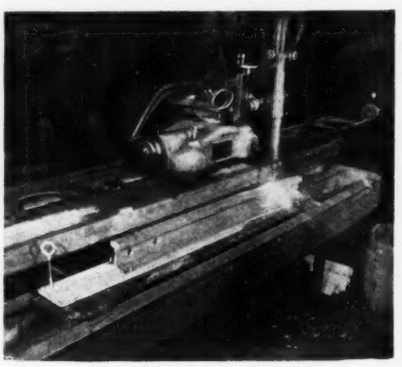
The first cut is made in the bottom flange at a speed of 20 in. per minute.





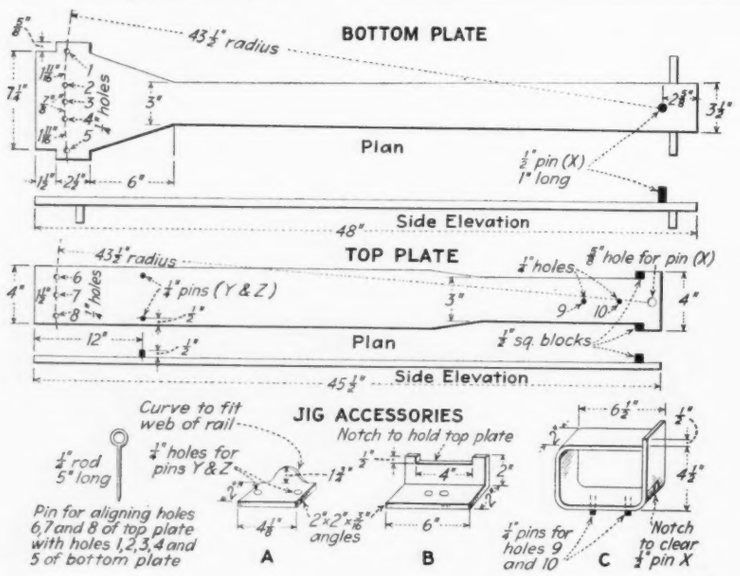
Cut No. 2 is made in the outside of the ball at 16 in. per minute.



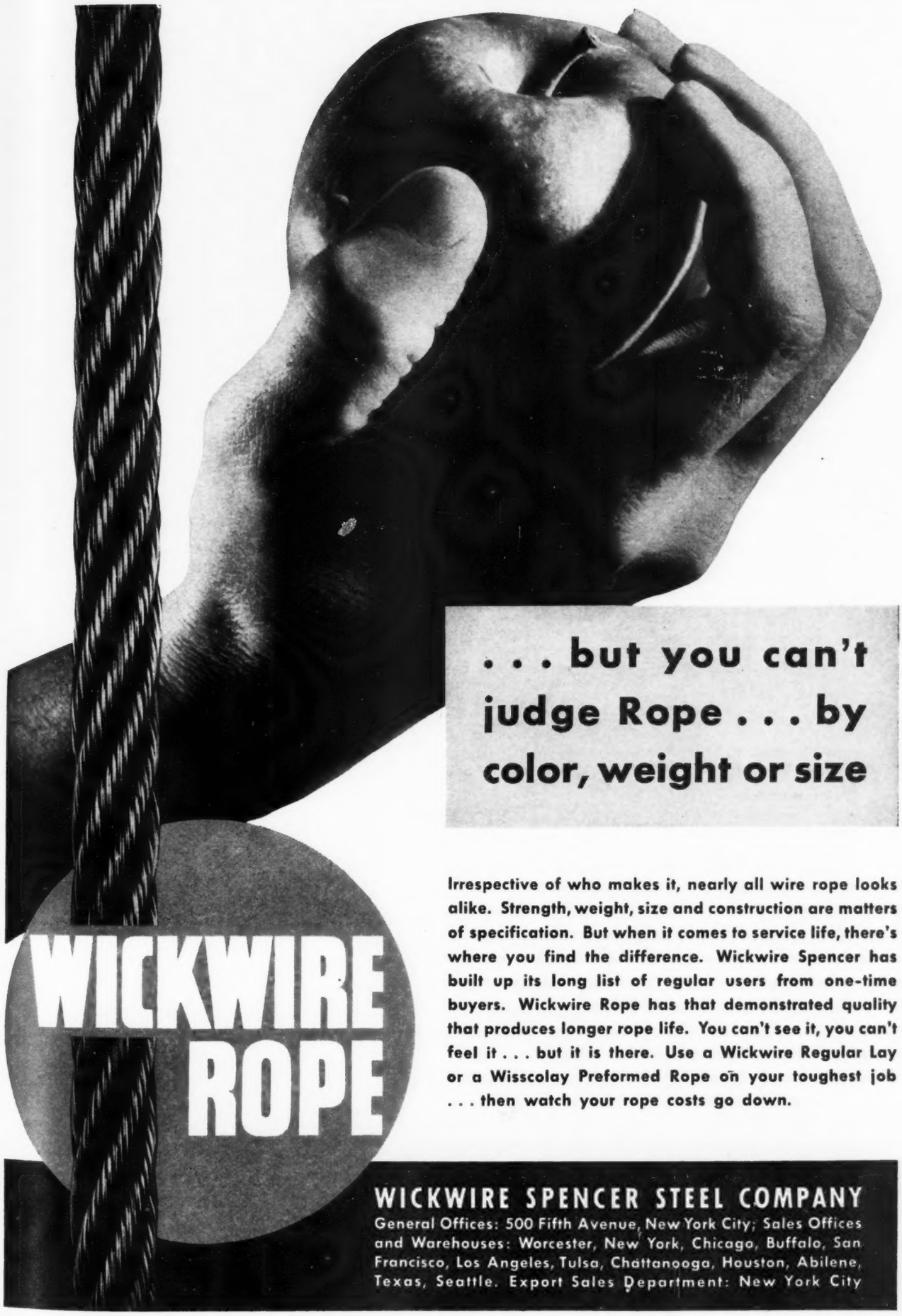


Cut No. 3, 5 deg. from the vertical, is made inside the ball at 16 in. per minute.

Details of jig used to position rails in flame-cutting 30-lb. switches.



Five cuts, as stated, are necessary in shaping a switch. These cuts and their sequence are shown in accompanying illustrations. Before the first cut is made the rails first are drilled and then are bent at an angle of 15 deg. 12 in. from one end, which results in the desired shape after all the cuts have been made. Cutting is done with an Oxweld Type CM-8 machine, which also is used for cutting circles, shapes, etc. Thirty-pound switches normally are made up in batches sufficient to provide a shift or two of work and the



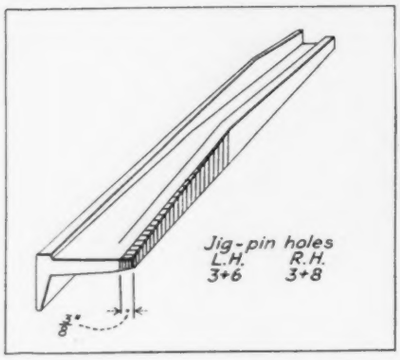
. . . but you can't judge Rope . . . by color, weight or size

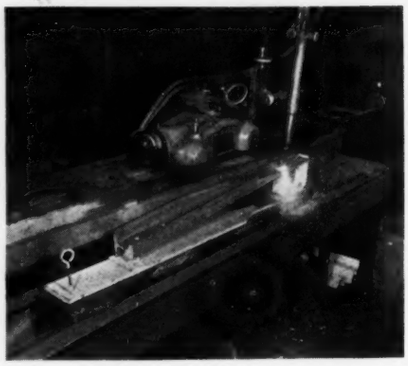
WICKWIRE ROPE

Irrespective of who makes it, nearly all wire rope looks alike. Strength, weight, size and construction are matters of specification. But when it comes to service life, there's where you find the difference. Wickwire Spencer has built up its long list of regular users from one-time buyers. Wickwire Rope has that demonstrated quality that produces longer rope life. You can't see it, you can't feel it . . . but it is there. Use a Wickwire Regular Lay or a Wisscolay Preformed Rope on your toughest job . . . then watch your rope costs go down.

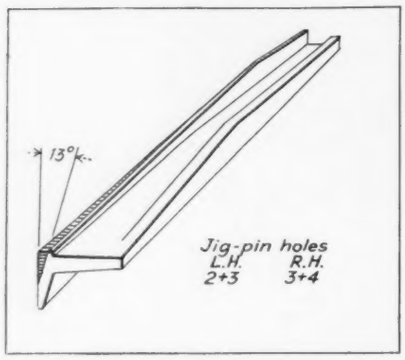
WICKWIRE SPENCER STEEL COMPANY

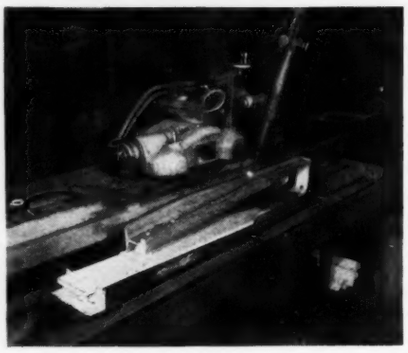
General Offices: 500 Fifth Avenue, New York City; Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City



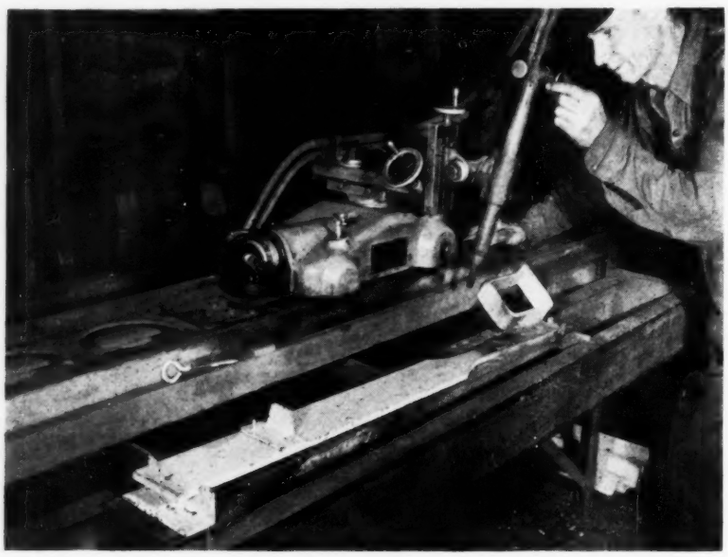


Cut No. 4 is made on top of the ball at 16 in. per minute, using two of the jig accessories

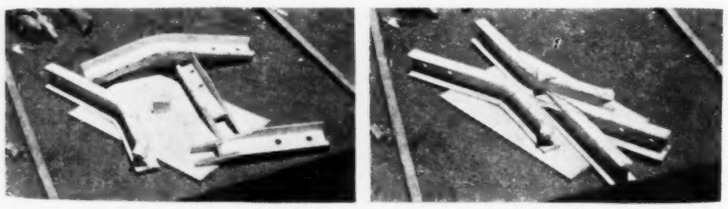




Cut No. 5, at 13 deg. from the vertical, is made at 12 in. per minute in the bottom of the flange, using all three of the jig accessories.



John Mays, machinist at New Monarch mine, in charge of setting up the switch cuts, looks over the cutting machine and jig.



Parts for a welded 30-lb. No. 3 frog are shown at left, while at right the parts have been placed as they would be when welding took place, except that small rectangular plate for filling in the point has not been inserted in the proper spot.

practice is to set the torch and jig and make all the No. 1 cuts first, the No. 2 cuts second, etc. A skilled man usually attends to the setting, after which the work is run off by the shop help. As a rule, about twenty pairs of 30-lb. switches can be cut in seven hours.

As indicated in the last illustration accompanying this article, the preparation of rails for a 30-lb. No. 3 frog requires only four simple cuts: i.e., on the top and bottom of each of the point rails. As these cuts naturally take out the web of the rail sections, a rectangular piece of steel plate is welded in the point to replace the web metal when the frog is assembled and welded to the baseplate.

In preparing this article, *Coal Age* acknowledges its indebtedness to the June issue of *Oxy-Acetylene Tips* for the line drawings. All photographs, however, were made in the shops at the New Monarch mine, Herrin, Ill., by a *Coal Age* representative.

—◈—

Induction Pick-up Installed For Cage Signaling

Used over six years in Wisconsin's largest iron mine, the Montreal, the shaft-signaling system described below is submitted by Paul C. Ziemke, Milwaukee, Wis. The system includes a small transmitter (not radio) on the cage to which is connected a short antenna wire outside the cage and extending upward a few feet. A pick-up wire is installed in the shaft, reaching from top to bottom, and is connected to a dynamic speaker and amplifier in the hoist room. This pick-up is a solid No. 6 rubber-covered copper wire supported on ordinary trolley hangers at 100-ft. intervals. Receiving equipment in the hoist room consists of a 37-50 Webster amplifier, a 0.03-microfarad condenser, two 227 tubes, two 281 tubes, two 250 tubes, one No. 411 Magnavox speaker and one No. F-3683 induction coil. The system is powered by 110-volt 60-cycle alternating current.

With this equipment, the cage attendant can signal the engineer from any point in the shaft whether the cage is stopped or in motion. No conflicting signals can originate from any other point. Signals are transmitted by induction from the antenna on the cage to the pick-up wire 3 in. away. Much time is saved in making shaft inspections and repairs with this signal system and the sending apparatus always is with the men. An added feature is a switch mounted in the cage bonnet. Should the cage stick in the shaft or the safety catches operate, the engineer immediately receives a stop signal.

The salient features of the system are briefly summed up by Mr. Ziemke as follows: (1) Signals can be sent to the engineer from any point in the shaft regardless of whether the cage is stopped or in motion; (2) the system operates at any shaft depth; (3) signals can be made only from the cage; and (4) the engineer automatically receives a stop signal from the bonnet switch in case of rope failure or the cage sticking.

WORD FROM THE FIELD

Anthracite Marketing Plan Offered by Independents

Creation of a joint committee of representatives of the anthracite industry and four business men from the hard-coal region to investigate the industry as a preliminary to assisting it was authorized at a meeting of the Anthracite Operators' Association held Aug. 31 at the Hotel Sterling, Wilkes-Barre, Pa. The business men would be empowered to offer suggestions and attend association meetings by the terms of the resolution. The association is composed of independent operators (*Coal Age*, September, p. 78), and the members in attendance at the session represented 85 per cent of that group in the field.

Three plans were presented and discussed: (1) voluntary establishment of last April's circular prices with increases to be made every fifteen days until the proper level is reached; (2) allocation of anthracite tonnage on a percentage basis with old-line and independent companies dividing their respective shares; (3) adoption of a code of fair practices to govern marketing of anthracite.

Some kind of regulatory measure that would stabilize the industry was the aim of the association, according to a spokesman, who said that it was hoped that this goal would be achieved through the three-point program. If the old-line companies agree to establishment of a price floor for the industry and adoption of a code of fair pratices, he added, it will expedite elimination of the industry's troubles.

—◈—

Indiana S.O. 50 Years Old

The Standard Oil Co. of Indiana is 50 years old. In commemoration of its golden anniversary it has issued a 60-page booklet, entitled "The First Fifty," written by F. Lawrence Babcock, in which are recounted early discoveries of oil in the Hoosier State as well as the story of production, piping, refining, and marketing.

—◈—

Gas Line Being Constructed

The Northern Natural Gas Co. has obtained authorization from the Securities and Exchange Commission for a $22,000,000 bond issue, about $4,000,000 of which is being used to construct a gas line from Sioux City, Iowa, to Minneapolis, Minn. Though the company is now serving Minneapolis, it is not serving the territory between that city and Sioux City, but is, nevertheless, proceeding with construction of this line without obtaining a certificate of convenience and necessity from the Federal Power Commission. The National Coal Association, through counsel, has urged the Power Commission to invoke its jurisdiction over this construction inasmuch as new territory including 24 towns would be served thereby.

Keeping Step With Coal Demand

Bituminous Production

Week Ended	1939 (1,000 Tons)	1938* (1,000 Tons)
August 5	7,300	5,853
August 12	7,410	6,042
August 19	7,413	6,316
August 26	7,695	6,535
September 2	8,080	6,934
September 9	7,627	6,517
Total to Sept. 9	234,725	212,149
Month of August	**34,470**	**28,665**

Anthracite Production

August 5	766	547
August 12	822	425
August 19	773	410
August 26	845	687
September 2	917	948
September 9	821	516
Total to Sept. 9	34,293	30,918
Month of August	**3,835**	**2,735**

*Outputs of these two columns are for the weeks corresponding to those in 1938, although these weeks do not necessarily end on the same dates.

Bituminous Coal Stocks

	(Thousands of Net Tons) Aug. 1 1939	July 1 1939	Aug. 1 1938
Electric power utilities	6,963	6,695	7,905
Byproduct coke ovens	4,535	3,548	5,364
Steel and rolling mills	511	518	652
Railroads (Class 1)	4,243	4,484	4,532
Other industrials†	8,373	7,516	8,812
Total	24,625	22,761	27,265

Bituminous Coal Consumption

	(Thousands of Net Tons) July 1939	June 1939	July 1938
Electric power utilities	3,538	3,317	3,038
Byproduct coke ovens	4,748	4,361	3,085
Steel and rolling mills	665	671	583
Railroads (Class 1)	5,903	5,748	5,482
Other industrials†	6,915	7,424	6,674
Total	21,769	21,521	18,862

†Includes beehive ovens, coal-gas retorts and cement mills.

Technical Men to Discuss Advances in Coal Use

Recent advances in the use of anthracite and bituminous coal will be discussed at a joint meeting of the American Institute of Mining and Metallurgical Engineers and the American Institute of Mechanical Engineers to be held Oct. 5-7 at the Deshler-Wallick Hotel, Columbus, Ohio. Mining methods, engineering service, new firing equipment, slag research, testing techniques, flame photography, steel melting, and the manufactured-gas industry are some of the subjects relating to the central theme of coal utilization on which well-known authorities will speak. The program includes four technical sessions, the annual dinner, and a morning of visits to manufacturing plants and industrial research laboratories at Battelle Memorial Institute.

The opening session will be a symposium on the effect of mining methods on coal characteristics. Thomas F. Downing, Jr., Philadelphia Electric Co.; William C. McCulloch, United Electric Coal Cos.; and Prof. John W. Buch, Pennsylvania State College, will speak for the bituminous underground, bituminous strip and anthracite underground mines, respectively.

Improving Coal's Position

In the afternoon of the first day, T. R. Workman, fuel engineer, West Virginia Coal & Coke Corporation, will show how the coal producer attempts to follow through to the ultimate consumer with research and advice on the engineering aspects of coal utilization. R. L. Brown, fuel engineer, General Coal Co., will discuss the need and possible form for an acceptance test for steam coal. Recent developments in anthracite firing equipment for commercial and industrial heating will be described by William Lloyd, Combustion Engineering Corporation.

In the morning of the second day, the use of pulverized coal as a fuel for open-hearth steel-melting furnaces will be described by Joseph P. Kittredge, National Malleable & Steel Castings Co. C. C. Russell, Koppers Co., will present a new technique for measuring expansion pressures in the coking of coal. A. M. Beebe, Rochester Gas & Electric Co., will discuss the future of manufactured gas and the interdependence of the gas and coal industries in supplying the public demands for energy in the form of gas.

The concluding technical session will feature research on coal-ash slags and the use of photography in flame and combustion studies. P. Nicholls and W. T. Reid, Pittsburgh Experiment Station,

U. S. Bureau of Mines, will describe equipment developed for measuring slag viscosity and present data on a wide variety of slags. A. A. Markson and W. H. Dargan, Consolidated Edison Co., will describe their methods of furnace photography, showing motion pictures and slides, some in color.

Dean C. E. MacQuigg, College of Engineering, Ohio State University, will preside at the annual dinner, Oct. 5. Dean Langsdorf, Washington University engineering school, will be the guest speaker. R. A. Sherman, Battelle Memorial Institute, is general chairman, heading a joint committee including H. O. Croft, H. F. Hebley, J. E. Tobey and H. E. Nold. Prof. S. R. Beitler, department of engineering, Ohio State University, is chairman of the local committee on general arrangements.

Two other technical societies will hold meetings in connection with the joint fuels sessions. On Oct. 4, Subcommittee XIII on Sampling, Committee D-5, Coal and Coke, American Society for Testing Materials, will meet on call by H. F. Hebley, chairman. On the same day, the Technical Advisory Committee on Solid Fuels of the American Society of Heating and Ventilating Engineers will meet under the chairmanship of Col. W. A. Danielson. Both these meetings will be held at Battelle Memorial Institute.

Members of these groups will be welcome on Oct. 7 to inspect Battelle research laboratories, where investigations in fuels, metallurgy, ceramics, and chemistry are carried on. Arrangements also are being made for visits to the Jeffrey Mfg. Co. and the municipal lighting plant.

Anchor Mine to Reopen

Anchor mine of the former Anchor Fuel Co., at Bon Carbo, Colo., was scheduled to reopen late in September after several years' idleness. The contemplated resumption was announced by G. M. O. Toller, owner of the property.

Mine "B" Gets Safety Trophy

Mine "B" of the Union Pacific Coal Co., Superior, Wyo., received its second Sentinels of Safety Trophy on Sept. 2 (see *Coal Age*, July, p. 92). The mine operated without a lost-time injury in 1938. The trophy, which is bestowed by the *Explosives Engineer* for outstanding safety achievement, was presented at a banquet held at the Old Timers Building, Rock Springs, Wyo., the ceremonies being interspersed with band music supplied by the Rock Springs Band. This is the fourth time a Sentinels Trophy has been captured by a Union Pacific Coal Co. mine.

I. N. Bayless, general manager of the company, was chairman, and there were talks by M. R. Budd, *Explosives Engineer;* A. W. Dickinson, American Mining Congress; George B. Pryde, vice-president, Union Pacific Coal Co.; R. C. Allen, former president, American Institute of Mining and Metallurgical Engineers, who made the presentation of the trophy; Eugene McAuliffe, Union Pacific president; E. H. Denny, U. S. Bureau of Mines, Denver station, and George A. Brown, mine superintendent at Superior.

Coal Men Meet Oil Men in Western Confab Held by Canadian Mining Institute

COAL MEN were well represented at the 21st annual Western meeting of the Canadian Institute of Mining and Metallurgy, Aug. 30 to Sept. 1, at the Hotel Palliser, Calgary, Alta. Most of the papers presented dealt with the oil fields of Alberta and New Brunswick. One related to the geology of the Brazeau area, in which both coal and oil men alike are interested, and another to the new Michel tipple of the Crows' Nest Pass Coal Co. at Fernie, B. C.

Measures in the Brazeau field are somewhat typical of those in Alberta generally, though the measures thicken and thin and the Mississippian in places is absent. At the top of the column is the Paskapoo formation, of Tertiary age; below this come in turn the Edmonton, Belly River and Brazeau-Pierre formations, of the Montana group of the Upper Cretaceous age; under these again are the Upper Colorado Shale, the Big Horn, or Cardium Sandstone, and the Lower Colorado Shale, forming together the Colorado group of the same Upper Cretaceous age, said J. O. G. Sanderson, consulting geologist, Calgary. Under these formations again, and still Upper Cretaceous, is the Blairmore, of the Dakota group.

Still descending, may be found, but not near Brazeau, the Kootenay group, of Lower Cretaceous age, and in the Brazeau area the Fernie formation, of Jurassic age. No traces can be found of the Pennsylvanian group, of Palezoic age, but the Mississippian is represented by the Rundle, or Madison, Limestone and the Banff, and these in turn are underlaid by the Minnewanka, of Devonian grouping.

About 1924, Western Canada introduced the first of its pneumatic cleaners to clean such coal as was too small to pick, said W. C. Whittaker, Crows' Nest Pass Coal Co., and with these machines came more elaborate screening plants and an increased demand for closely sized products such as stoker coals. Wet washing came later, for the companies did not want to heat-dry their coal, but not all sizes down to ⅜-in. are commonly wet-cleaned. Finer sizes usually are cleaned dry.

Two RB12 American air tables to clean minus 1¼-in. coals for stokers and to furnish a low-ash feed for beehive coke ovens were installed by the Crows' Nest Pass Coal Co. in 1932. No. 1 table cleaned minus 1¼-in., from which 1¼x¾-in. cleaned coal was taken by two Plat-O screens. The ¾-in.x0 was then recleaned on a No. 2 table.

Plant Serves Three Mines

In 1936, three Vissac jigs and dryers handling all coal below 7 in. and above ⅜ in. Tyrod were installed, but, in October, 1937, this plant was burned. The new plant was completed in 1938. This Michel tipple receives coal from three mines having products of widely differing characteristics. Six sizes are shipped and in some cases the coals from the several seams are treated separately, making the layout more complex than is usual in the Pass district in which Michel is situated, explained Mr. Whittaker. The new plant is of steel and reinforced concrete and has a capacity of 300 tons per hour. It has eight loading tracks, four boom loaders, two box-car loaders and bin capacity for holding 2,400 tons of slack.

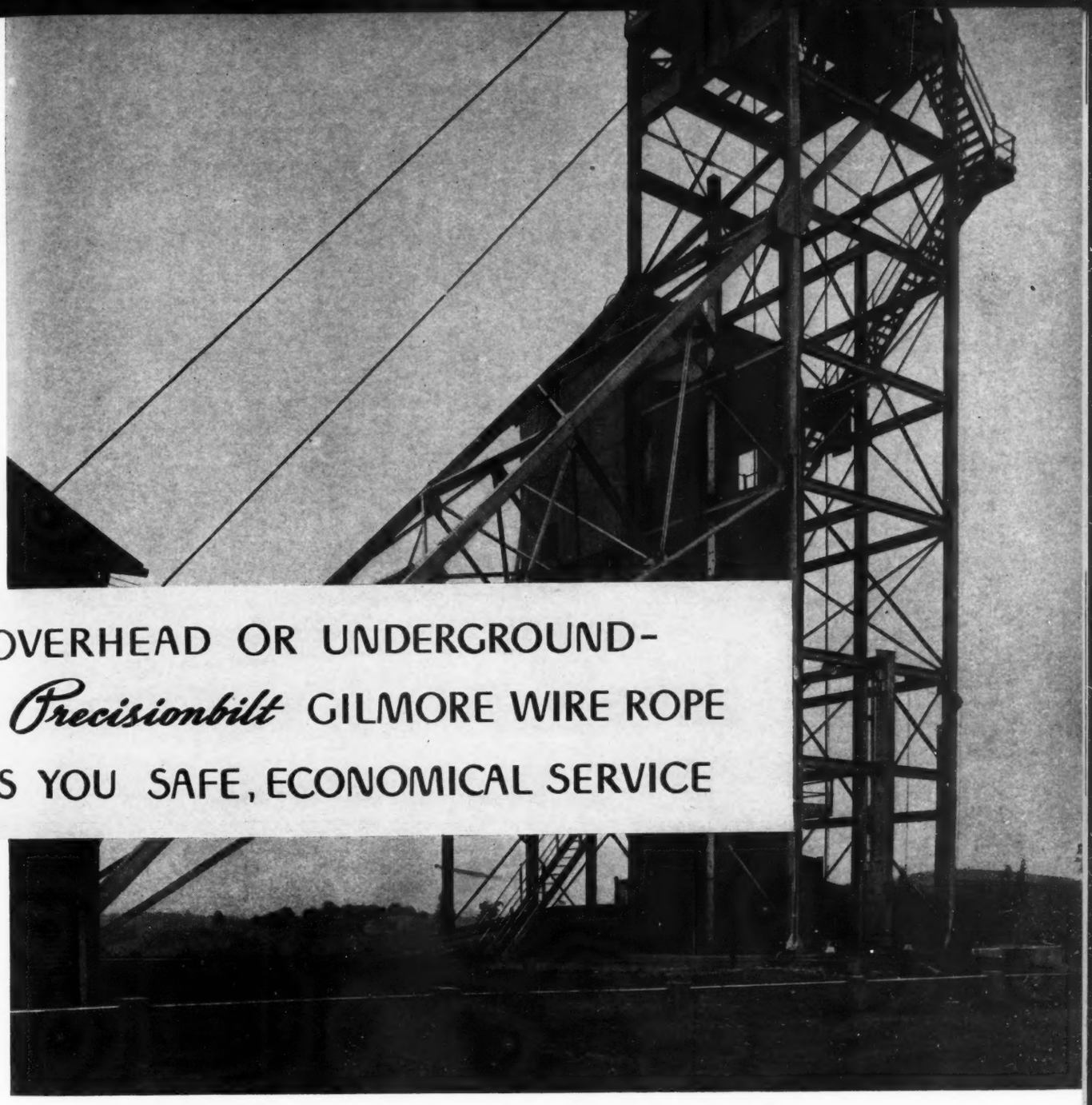
The 7x¾-in. coal is washed and the ¾-in.x0 coal dry-cleaned. Dustproofing is provided by the Viking oil-spray system. Besides a 6-in. fire-protection line, twelve fire hydrants and hoses, also soda-acid extinguishers at various points, pyrene extinguishers at each electrical distribution panel and three siren alarm stations were provided, and slack storage bins were fitted with an overhead sprinkler system and with provision for flooding the bins with live steam in case of serious fire. A reinforced-concrete curtain wall separates wet and dry parts of the plant. Dust in the dry section of the structure is removed continuously during operation.

Describing the flow of coal through the cleaner, Mr. Whittaker said that a shaker at the head of the plant separates the coal into plus 7-in., 7x1⅜-in. and 1⅜-in.x0. Plus 7-in. goes to a 42-in. conveyor belt driven by a variable-speed motor, so that the belt can be run at 60 ft. per minute for picking, but, if the wet washing section is to be bypassed, all the coal can be delivered to the belt for that purpose and the belt run at 180 ft. per minute.

The 7x1⅜-in. coal feeds from the main shaker to a balanced shaker feeder which delivers it to a No. 1 Vissac jig. Clean coal goes to No. 1 dryer, which has a steel wedge-wire deck with 1-mm. openings, where hot air from two Morrison unit heaters removes excess moisture. In the last 6 ft. of the dryer a plate perforated with 1-in. holes replaces the

Coming Meetings

- Joint meeting of Coal Division of American Institute of Mining and Metallurgical Engineers and Fuels Division of American Society of Mechanical Engineers: Oct. 5–7, Deshler-Wallick Hotel, Columbus, Ohio.
- Coal Producers' Association of Illinois: annual meeting, Oct. 10, Hotel Abraham Lincoln, Springfield, Ill.
- Lehigh Valley Section of American Institute of Electrical Engineers: Oct. 11–13, Hotel Casey, Scranton, Pa.
- National Safety Council: 28th safety congress, Oct. 16–20, Atlantic City, N. J.
- National Coal Association: Seventeenth convention, Oct. 23–25, Roosevelt Hotel, New York City.
- Illinois Mining Institute: 47th annual meeting, Nov. 10, Hotel Abraham Lincoln, Springfield, Ill.
- West Virginia Coal Mining Institute: annual meeting, Nov. 10, Hotel Morgan, Morgantown, W. Va.
- Harlan County Coal Operators' Association: annual meeting, Nov. 15, Harlan, Ky.



OVERHEAD OR UNDERGROUND-
J&L *Precisionbilt* GILMORE WIRE ROPE
GIVES YOU SAFE, ECONOMICAL SERVICE

Uniformity — strength — safety — abrasion-resistance — these are the qualities of J & L Gilmore Wire Rope which give you maximum economy in your mining operations. Made exclusively of J & L Controlled Quality (CQ) Steel, on the world's newest wire rope making machines, Precisionbilt ropes are uniform in strength and section and scientifically lubricated throughout. An inherent quality of safety, in Precisionbilt ropes, comes from the skill of our workmen and their deep understanding that human life may depend upon every length of rope they make.

When you need replacement wire rope for your present equipment — or when you order new equipment — specify J & L Precisionbilt. It will give you long, satisfactory service. Write today for our catalog of mining and quarry ropes.

J & L — PILOTS THE COURSE OF CONTROLLED QUALITY IN STEEL

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS

GILMORE WIRE ROPE DIVISION
PITTSBURGH, PENNSYLVANIA

J&L STEEL

J & L — PARTNER IN PROGRESS TO AMERICAN INDUSTRY

wedge-wire screen. Then follows sizing on a triple-deck screen which delivers 7x3-in. and 3x1½-in. which are deposited separately on the lower strand of either of two distributing screens or to either of two loading booms.

A battery of six double-decked Plat-O screens set in parallel receive 1½-in. x 0 coal from the main shaker and delivered 1½-in. circular-hole x ¾-in. Tyrod, ¾-in. Tyrod x ½-in. Tyrod and ½-in. Tyrod x 0, added Mr. Whittaker. The first two products go to No. 2 and No. 3 jigs and the third to a 15-ton surge bin over an RB pneumatic separator located beneath the screen room.

From the jigs the cleaned products go to two dewatering screens with 1-mm. bronze wedge-wire decks from which the coals pass to four Vissac heat dryers, two to each size, and thence to any loading boom, any box-car-loader surge bin or in whole or in part to storage in clean-slack bins. Though the results of cleaning are quite satisfactory, Mr. Whittaker declared, this was achieved partly because the coal was easy to clean. Only 4.2 per cent of the feed lies between 1.48 and 1.68 specific gravity. He estimated the efficiency of one of the jigs at 97.86 per cent; 2.14 per cent of the material reported to the wrong product; that is, coal to refuse and refuse to coal. Had the fine-coal plant been conducted at a lower specific gravity the efficiency would have been seriously affected, he added.

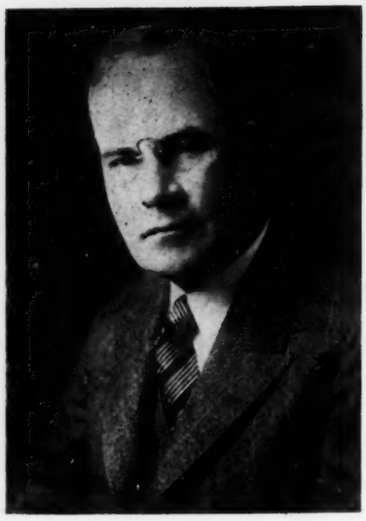
Dust collection by American Coal Cleaning cyclones saved 16 tons of dust per 8-hour shift. Of the dust exhausted by the collecter fan, the 80- to 100-mesh has 2.8 per cent of ash; the 100- to 200-mesh, 1.87 per cent; the minus 200-mesh, 2 per cent. The exhausted dust averaged 2 per cent, which suggested to Mr. Whittaker the use of a bag filter to recover these values. Ten Curran-Knowles sole-flue coke ovens are under construction at the Michel plant, the speaker declared. (Since then they have been completed.)

Trips were made to Turner Valley and to Dinosaur Park, St. Georges' Island, Calgary, where life-size reproductions of saurians in action appear to be strolling in the park or looking for prey. A luncheon at which J. R. Smith, sales manager, West Canadian Collieries, presided, was addressed by the institute's secretary, E. J. Carlyle, and the banquet, with B. L. Thorne, president of the institute, as toastmaster, was entertained with rapid-fire speeches by R. Dawson Hall, engineering editor, *Coal Age*, New York City; Dr. J. A. A. Henderson, Moncton, N. B.; Prof. M. B. Baker, Kingston, Ont.; F. D. Shepherd, Winninpeg, Man.; Dr. F. H. Edmunds, Saskatoon, Sask., and H. Mortimer Lamb, Vancouver, B. C.

Personal Notes

F. S. BAIRD has been appointed general coal freight agent by the Norfolk & Western Railway Co., vice G. C. VAN ZANDT, retired.

JOHN E. BUTLER, general manager of the Stearns Coal & Lumber Co., Stearns, Ky., has also been elected president. Active in an executive capacity with the company since 1903, Mr. Butler succeeds ROBERT L. STEARNS, who has become chairman of the board. Mr. Butler also is a director of the National Coal Association, Appalachian Coals, Inc., and the Southern Appalachian Coal Operators' Association.



John E. Butler

GLEN B. GORDON has resigned his position as general storekeeper at the Zeigler mines of the Bell & Zoller Coal & Mining Co., Zeigler, Ill., to become vice-president and treasurer of the Grape Creek Coal Co., a stripping operation at Danville, Ill. He formerly was with the Safety Mining Co., joining Bell & Zoller in 1936.

FRANK KOLBE, a director of the United Electric Coal Cos., has been made president, succeeding Louis Ware, who resigned to become head of the International Agricultural Co.

FREDERIC A. ONDERDONK, for many years with the firm of Dickson & Eddy, New York City, and formerly manager for that company, is now associated with the C. L. Amos Coal Co., Syracuse, N. Y., as sales manager.

J. D. WRIGHT, assistant manager, industrial department, General Electric Co., has been named chairman of the committee on industrial power applications by the American Institute of Electrical Engineers. Others named to the committee are: E. A. ARMSTRONG, Public Service Co. of Northern Illinois; T. F. BARTON, General Electric Co.; R. F. CHAMBERLAIN, professor of electric engineering, Cornell University; C. W. DRAKE, Westinghouse Electric & Mfg. Co.; J. H. EDWARDS, associate editor, *Coal Age*; E. GORDON FOX, Freyn Engineering Co.; JOHN GROTZINGER, Goodyear Tire & Rubber Co.; F. E. HARRELL, Reliance Electric Co.; L. C. ILSLEY, U. S. Bureau of Mines; R. L. KINGSLAND, electrical engineer, Consolidation Coal Co.; A. E. KNOWLTON, associate editor, *Electrical World*; CARL LEE, electrical engineer, Peabody Coal Co.; M. J. MCHENRY, Canadian General Electric Co.; F. C. NICHOLSON, electrical engineer, Glen Alden Coal Co.; J. J. ORR, United States Rubber Co.; WILLIAM A. PERRY, Inland Steel Co.; D. E. RENSHAW, Westinghouse Electric & Mfg. Co.; H. W. ROGERS, General Electric Co.; F. O. SCHNURE, Bethlehem Steel Co.; L. A. UMANSKY, General Electric Co.; R. L. WALSH, Universal Cement Co.; R. H. WRIGHT, Westinghouse Electric & Mfg. Co.

Hearing on Exemption Rule Before Coal Division

Another step designed to assure the effectiveness of minimum bituminous coal prices when established was taken by the Bituminous Coal Division when it started a hearing Sept. 14 on a proposed rule affecting exemptions under the Guffey act. The rule is intended to prevent producers not acting in good faith from evading minimum prices and marketing rules and regulations.

Director Howard A. Gray points out that the act provides that any producer believing his commerce in bituminous coal is not subject to the provisions of the law may file a sworn affidavit with the Division requesting exemption and setting forth the facts upon which his claim is based. The filing of such an application in good faith automatically exempts the producer from minimum prices and marketing regulations beginning with the third day following the filing, until the Division acts finally upon the application.

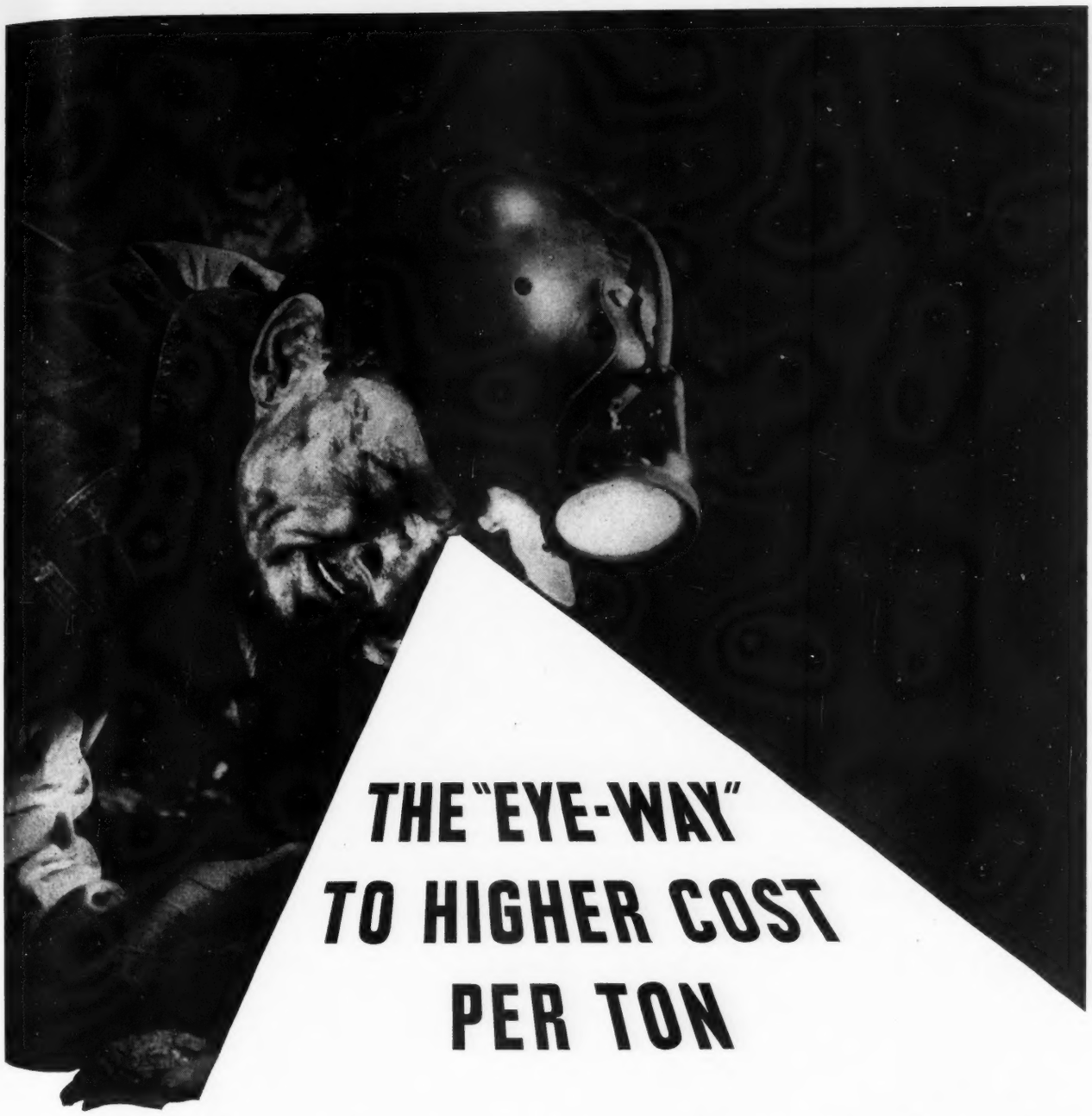
To prevent producers not entitled to exemption and not acting in good faith from evading minimum prices and marketing regulations through automatic exemption, the Division has proposed the following rule, which is the subject of the hearing:

"All applications seeking exemption pursuant to the provisions of the second paragraph of Sec. 4-A should be filed within the following periods of time:

"(1) If the commerce covered by the application exists upon the effective date of this rule, not more than 30 days after such date.

"(2) If the commerce covered by the application is entered into after the effective date of this rule, but before the effective date of minimum prices, not

Serving a new stripping operation near Millstadt, Ill., this modern preparation plant of the Midwest Smokeless Fuel Corporation includes a washery (right) with lump boom for truck loading and storage bins for other sizes, also designed for truck loading, at the left.



THE "EYE-WAY" TO HIGHER COST PER TON

...close it with American Optical Goggles

As long as flying chips of coal find *unobstructed paths* into miners' eyes, so long will cost-per-ton be constantly subject to sudden upward revision, anywhere from 1c to 5c. But keep chips out of eyes with goggles, and you can keep costs on a more even keel.

Many modern mines bear witness that eye-protection is a major factor in cost-control. And they have found, too, that American Optical Goggles generally appeal to miners as a "good buy" because of their good looks, their light-weight comfort, their economical durability, and their uniform dependability.

If you want proof that protected eyes mean protected profits, write this down now: "See about AO Goggles." And put the matter up to your local Mine Safety Appliances Company representative, next time he's in your office.

American Optical Company

Factories at Southbridge, Massachusetts

REPRESENTED IN THE MINING INDUSTRY BY MINE SAFETY APPLIANCES COMPANY

6377

Sales of Mechanical Stokers Register Further Rise

Sales of mechanical stokers in the United States during July last totaled 9,525, according to statistics furnished the U. S. Bureau of the Census by 101 manufacturers (Class 1, 58; Class 2, 32; Class 3, 36; Class 4, 34; Class 5, 17). This compares with sales of 7,866 units in the preceding month and 9,061 in July, 1938. Sales by classes in July last were: residential (under 61 lb. of coal per hour), 8,386 (bituminous, 7,107; anthracite, 1,279); small apartment-house and small commercial heating jobs (61 to 100 lb. per hour), 447; apartment-house and general small commercial heating jobs (101 to 300 lb. per hour), 413; large commercial and small high-pressure steam plants (301 to 1,200 lb. per hour), 197; high-pressure steam plants (more than 1,200 lb. per hour), 82.

more than 30 days after the date such commerce is entered into.

"Any application which is filed after the periods herein specified will be presumed not to have been filed in good faith."

Presentation of affirmative evidence in the final hearing on minimum prices in Districts 1-8, which began on July 24, ended on Aug. 25. Thereupon the hearing of producer protests began, about 125 having indicated at that time that they would appear. However, the hearing of producer protestants was concluded on Aug. 31, and consumer protestants began their proceedings the following day.

New Preparation Facilities

BERWIND-WHITE COAL MINING CO., St. Michael, Pa.: Contract closed with Roberts & Schaefer Co. for Stump Air-Flow equipment to clean 115 tons per hour of ¾-in.x0 coal; addition to existing equipment; to be completed Dec. 31.

CROWE-FULTON-SPANGLER COAL CO., mine near Harvey, Mo.: Contract closed with Deister Machine Co. for No. 16 Deister Plat-O washing table; estimated capacity, 15 tons per hour of ⅜-in.x0 coal.

H. E. HARMAN COAL CORPORATION, Harman, Va.: Contract closed with Roberts & Schaefer Co. for structure with complete hydroseparator coal-washing equipment to prepare 3x1¼-, 1¼x¾-, ¾x½-in. coal; capacity, 225 tons per hour of 3x½-in.; to be completed about Dec. 15.

HEISLEY COAL CO., Nanty Glo, Pa.: Contract closed with Roberts & Schaefer Co. for installation of Pangborn dust-collection equipment and structure; capacity 45 tons; to be completed Oct. 1.

PIONEER COAL CO., Arcadia Kan.: Contract closed with McNally-Pittsburg Mfg. Corporation for McNally-Norton automatic washer to treat 150 tons per hour of 6x¾-in. coal, classifying into five sizes; to be completed in December.

WALTER S. RAE, mine at Jackson Center, Pa.: Contract closed with Roberts & Schaefer Co. for complete hydroseparator coal-

FROM ROD TO REEL

MADE TO MAKE GOOD

From the approved hot rolled wire rods thru Macwhyte's furnaces, cleaning, baking, cold drawing of wire, and fabrication of wire into wire rope—at every step of the way Macwhyte Wire Rope is made to make good.

ASK FOR A MACWHYTE WIRE ROPE RECOMMENDATION

IT'S LABORATORY TESTED . . . Not just ordinary, routine tests, but *exacting, severe* tests . . . many of them . . . are given all Macwhyte ropes. Which means that when they're given a "final OK" at the mills, Macwhyte Wire Ropes are ready for dependable, economical service.

AND IT'S FIELD PROVED . . . On all kinds of jobs, on all kinds of equipment, under all kinds of conditions, Macwhyte ropes are constantly being proved. All year long, Macwhyte Engineers out on the job are constantly proving, improving, perfecting the *right* wire rope for your specific job.

NO. 426

MACWHYTE COMPANY
KENOSHA, WISCONSIN

Manufacturers of wire rope and braided wire rope slings . . New York . . Chicago . . Pittsburgh . . Ft. Worth . . Portland . . Seattle . . San Francisco . . (distributors throughout the U. S. A.)

MACWHYTE

Whyte Strand – PREformed WIRE ROPE

washing equipment; capacity, 100 tons per hour of 4x¾-in. coal; completed Sept. 15.

ROCHESTER & PITTSBURGH COAL CO., Waterman Mine No. 2, Homer City, Pa.: Contract closed with Roberts & Schaefer Co. for design and erection supervision of new tipple and preparation plant; equipment to include R & S revolving dump and feeder and Stump air-flow units to clean 125 tons of ¾-in.x0 coal per hour; sizes to be made, ¾x⅜- and ⅜-in.x0; tipple capacity, 250 tons per hour; to be completed Dec. 15.

TECUMSEH COAL CORPORATION, Dickeyville, Ind.: Contract closed with McNally-Pittsburg Mfg. Corporation for complete tipple and washery with capacity of 1,000 tons per hour; equipment to include McNally-Pittsburg double-roll breaker to break all mine-run to 6-in. and wash the entire 1,000 tons per hour in four McNally-Norton automatic washers, one a new compound middlings re-treatment unit; ¾-in.x½-mm. size to be dried in three McNally-Vissac dryers; complete crushing and mixing facilities for producing all market sizes of stoker coal; to be completed in March, 1940.

Energy Study Urges Less Waste In Fuel Output and Use

Recommendations of the National Resources Committee for a national energy resources policy in the interest of defense, conservation and economic betterment were emphasized when supporting data and research reports upon which the committee based its recent report on energy resources were made public on Aug. 28. This supplementary material —which deals particularly with coal, oil, natural gas and water power—was printed by Congress and includes the original report on energy resources which was prepared at the request of President Roosevelt for the National Resources Committee by a special Energy Resources Committee. The technicians responsible for these supporting documents have drawn their own conclusions from the data they assembled.

All of the nation's energy resources are discussed together, showing the interre-

Permissible Plates Issued

Five approvals of permissible equipment were issued by the U. S. Bureau of Mines in August, as follows:

Joy Mfg. Co.: Type U-179-21P chain conveyor; 20-hp. motor, 250 and 500 volts, d.c.; Approvals 377 and 377A; Aug. 8.

American Mine Door Co.: Type H rock-dust distributor; 15-hp. motor, 80 volts, d.c.; Approval 378; Aug. 24.

Sullivan Machinery Co.: Type CD-4 track-mounted drilling machine; 10-hp. motor, 440 volts, a.c.; Approval 379A; Aug. 29.

Joy Mfg. Co.: PL-11-2P elevating conveyor; 7½-hp. motor, 250 volts, d.c.; Approval 380; Aug. 29.

Burgess Battery Co.: Burgess electric lantern; Approval 1018; Aug. 11.

Hazacord Miners' Lamp Cord. Extra-flexible rubber insulated conductors are twisted helically about a strong cord center.

HAZARD
SHOT FIRING CORD
(Type D)

Hazard Wires and Cables for the Mining Industry include, among others, Borehole Cable, Armortite Power Cable, and Mining Machine Cable.

with a distinctive orange braid, a bright color that makes this cord particularly distinguishable when lying on the floor or ground. Being so easily seen, it escapes much unintentional rough usage. But it also protects itself by having an insulation with a tensile strength of more than a ton per square inch. The tough, free-stripping rubber insulation adequately insulates the conductors even when lying in water. This cord is supplied in 100 feet lengths for your convenience.

HAZARD INSULATED WIRE WORKS

DIVISION OF THE OKONITE CO.

WORKS: WILKES-BARRE, PENNSYLVANIA

New York Chicago Philadelphia Atlanta Pittsburgh Buffalo Boston Detroit Seattle
Dallas Washington Cleveland San Francisco St. Louis Los Angeles

lations and complexities of the problems involved in their effective use. According to the report, which is supported by the staff studies, the obvious fields of remedy with respect to conservation of energy resources seem to lie: (1) in promoting greater efficiency in the production of the fuel resources from the standpoint of recovery; (2) in promoting greater economy in the use of fuels; and (3) in placing a larger share of the energy burden on lower grade fuels and water power.

With these objectives in view, the major recommendations of the committee, in part, are as follows:

"*Oil and Gas*—We propose that a Federal oil conservation board or commission should be created within the appropriate Government department to administer the Federal interest in the oil and gas industry and to make necessary rules and regulations concerning the production of and commerce in oil and gas. It should have the authority to require that oil and gas be extracted by such methods as are adequate to avoid waste and to protect the interest of all producers drawing from a common reservoir.

"*Coal*—We believe that the problems of the bituminous coal industry are too large for any one State to solve. The intensity of interstate competition makes the ills of the industry a matter of national concern and Federal responsibility. Some form of Federal regulation of bituminous coal is clearly necessary.

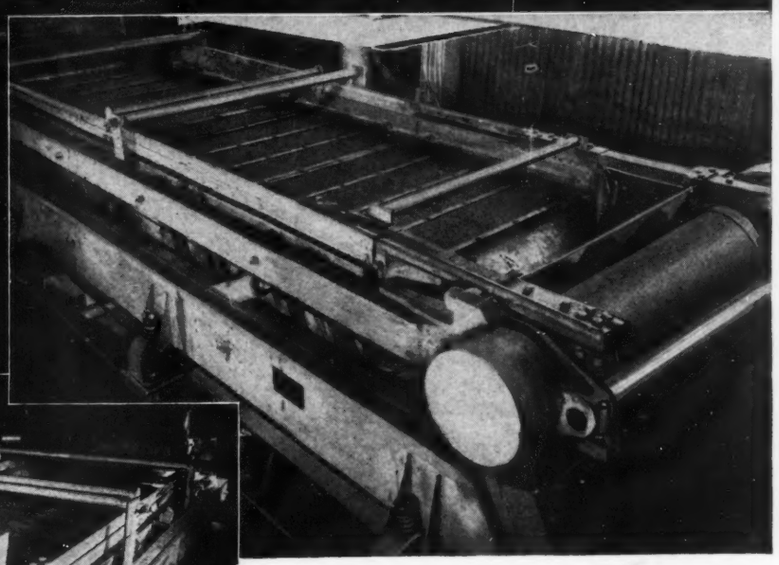
"*Water Power*—The committee wishes to emphasize—as it has in its previous reports—that an active public policy of multiple-purpose development of water resources is desirable, particularly in view of the pressing character of problems related to flood control, public water supply, stream pollution, irrigation, and navigation. An active policy of public development of water power is likewise desirable under certain appropriate conditions. Both the development directly for power purposes, where there is no conflict with more urgent water control, and the best feasible use of the head made available by water storage for other purposes would contribute toward the attainment of three major national objectives, namely:

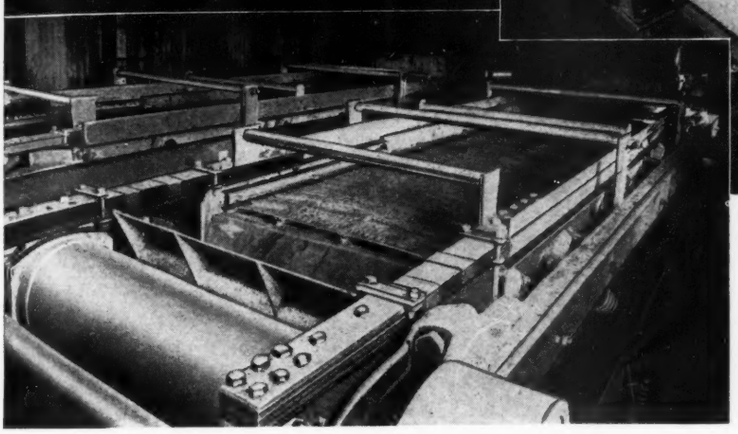
> "(a) Conservation of scarce fuel materials—petroleum, natural gas, and the higher grade coals.
>
> "(b) Strengthening the national economy, through making cheaper electric energy more widely available.
>
> "(c) Strengthening the national defense, through assuring an ample supply of electric energy in time of war."

In order to provide for continuous planning and studies of policies, the committee also recommended organization of an advisory planning group for the energy resources, which would be part of a national planning agency. In concluding the report the committee said, in part:

"It is difficult in the long run to envisage a national coal policy or a national petroleum policy or a national water-power policy without also in time a national policy directed toward all these energy producers—that is, a national energy resources policy. Such a broader and integrated policy toward the problems of coal petroleum, natural gas, and water power cannot be evolved overnight, for each of these problems is amazingly com-

Dewatering and Dedusting at Royalton Mine





Above—5' x 16' double deck dewatering screen.

Left—Two 4' x 14' double deck dedusting screens.

The new preparation plant at the Royalton Mine of the Franklin County Coal Corporation is another installation where the difficult screening is being done with flat Symons Screens. One screen for dewatering and two for dedusting aid in preparing coal to meet the requirements of present day markets. The horizontal Symons Screen is especially adapted for coal screening. Placed level, it sizes closer, lessens degradation, reduces headroom, and better fits into modern preparation plant construction.

When considering a new preparation plant, or modernizing an existing plant, investigate the merits of this level screen. Follow the example of outstanding coal mining companies now using Symons Screens.

NORDBERG MFG. CO., MILWAUKEE, WIS.

SYMONS SCREENS

plex and in combination they represent more than a simple sum of problems.

"Despite the complexity of these problems, in the national interest we shall have to move in the direction of solutions. It is well to remember that the present and proposed regulatory measures which we have discussed are designed to promote the development of the energy resources industries along lines that will be consistent with the broad national interest. The problems of conservation which dictate these measures are not the results of passing emergencies. Rather, they are continuing problems, and if they cannot be solved by the regulatory approach, then we may anticipate with some confidence that there will emerge an insistent and eventually irresistible demand for public ownership and control."

Ralph J. Watkins, assistant administrator, Wage and Hour Division, and formerly director of the Bureau of Business Research, University of Pittsburgh, was director of the studies and served as chairman. The Technical Committee on Energy Resources which was responsible for the report included: Capt. F. A. Daubin, U. S. Navy, Army and Navy Munitions Board; Charles W. Eliot, 2d, executive officer, National Resources Committee; A. C. Fieldner, Bureau of Mines; John W. Frey, Petroleum Conservation Division; Roger B. McWhorter, Federal Power Commission; W. C. Mendenhall, Director, Geological Survey; Col. H. K. Rutherford, Army and Navy Munitions Board; F. G. Tryon, National Bituminous Coal Commission, and Joel D. Wolfsohn, National Power Policy Committee.

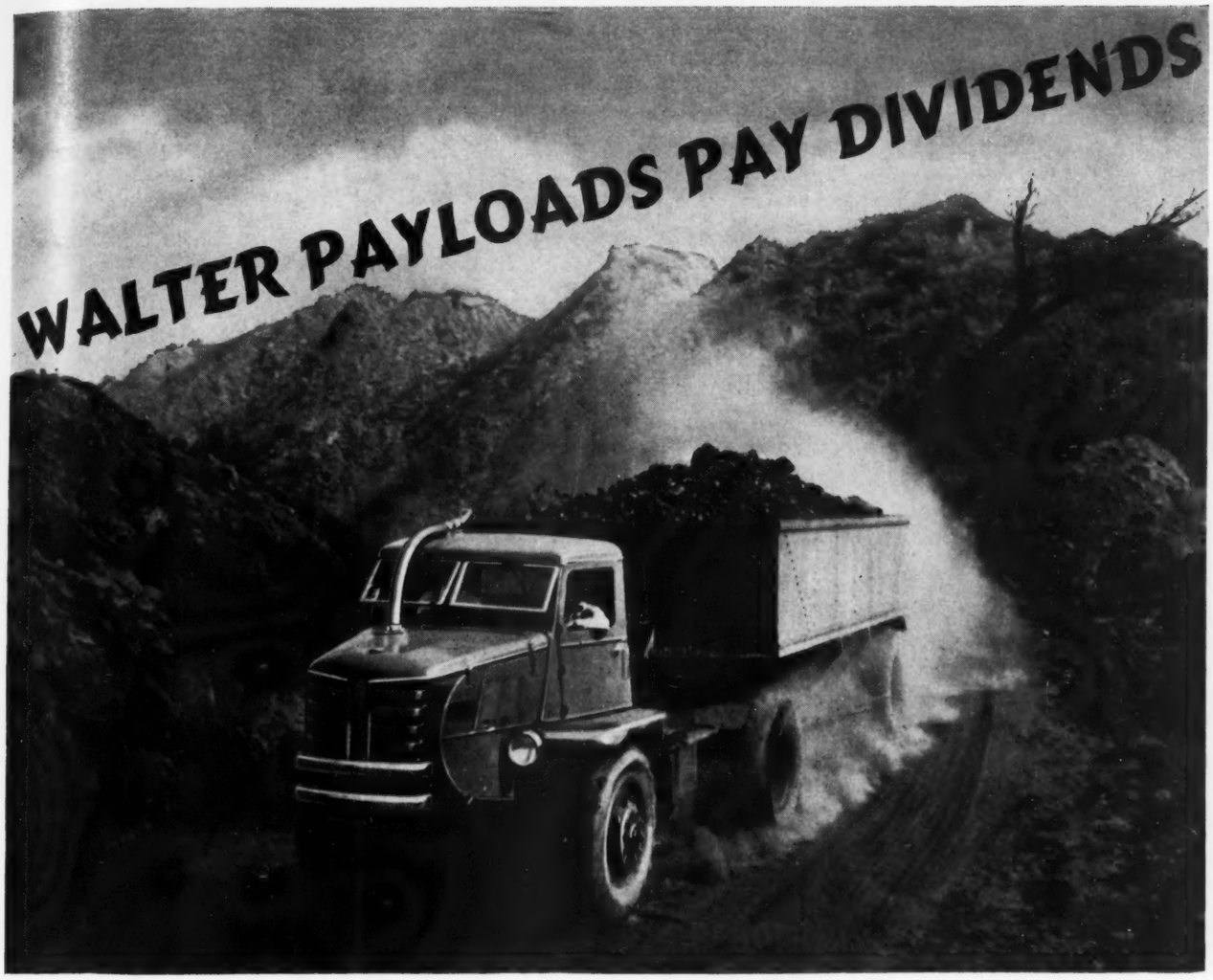
In transmitting the report to Congress, President Roosevelt said:

"The widening interest and responsibility on the part of the Federal Government for the conservation and wise use of the nation's energy resources raises many perplexing questions of policy determination. Clearly, there must be adequate and continuing planning and provision for studies which will reflect the best technical experience available, as well as full consideration for both regional and group interests. This report sets forth a useful frame of reference for legislative programs affecting these resources and illustrates another approach to the systematic husbandry of our natural resources. Specific recommendations are advanced for solution of the most pressing problems."

New Glen White Firm

Mines of the Glen White Coal & Lumber Co., at Glen White, Pa., which have been shut down since Dec. 27, 1937, during a receivership, are now being put in operation by the Glen White Coal Corporation, a new company formed by the unsecured creditors and stockholders of the old company. The general office of the new company is at Gallitzin, Pa., about two miles from the mine mouths. It will be in charge of A. J. McGeary, who was general superintendent of the the old company and is now secretary and general manager as well as a director. Other officers are: president, W. A. Silliman, mining engineer, Altoona; vice-president, Philip N. Shettig, attorney, Ebensburg; treasurer, K. A. Cooper, cashier of the First National Bank of Gallitzin.

The new firm has obtained a loan from



It takes close figuring to make a profit in coal stripping. A few cents per ton more or less may mean the difference between a deficit and a dividend.

In truck hauling the unit that hauls the biggest payload in the shortest time pays the biggest dividend. The Walter Tractor Truck above is hauling twenty tons of coal. The same unit is often used with two trailers, hauling a payload of fifty-five tons.

The remarkable success of Walter Tractor Trucks in coal stripping is due to Walter 100% traction and enormous ***available*** power, provided by the famous Walter 4-Point Positive Drive. In this, as in other extremely heavy duty hauling operations, users know that Walter Tractor Trucks will keep going under conditions that stop everything else on wheels.

This superiority is due to a combination of exclusive Walter features, including torque-proportioning automatic lock differentials, exceptional ground clearance, suspended double reduction drive, tractor type transmission, etc.

To be specific, Walter Tractor Trucks have reduced hauling costs in coal stripping as much as 58% under other methods.

Send for literature.

WALTER MOTOR TRUCK CO.

1001-19 IRVING AVENUE, RIDGEWOOD, QUEENS, L. I., N. Y.

the Reconstruction Finance Corporation, from which taxes, wages and other preferred claims against the old company have been paid, and which will provide working capital and funds to develop a large output from a new mine in the "B," Miller or Lower Kittanning seam which had been started only a short time before the receivership. The mine operated for many years by the old company in the "E," Lemon or Upper Freeport seam also will be operated, and a new mine in that seam is being developed close to the State highway for shipment by trucks exclusively.

Pittsburgh Coal Improves Ohio Facilities

With the likelihood of increased coal movement by river and rail from western Pennsylvania mines to Youngstown (Ohio) steel plants in mind, the Pittsburgh Coal Co. has begun improvements at its Smith's Ferry (Pa.) river-rail terminal and at its Negley (Ohio) coal-cleaning plant.

Additional machinery will be installed to increase the terminal capacity and steel storage bins and hoppers will be provided at the cleaning plant. Work is under way on a highway 36 ft. wide and two miles long from the cleaning plant to the village of Negley. The program is expected to be completed before winter at a cost of about $500,000. In the meantime the Pittsburgh company is handling a large tonnage of coal over its private railroad between Smith's Ferry and Negley for the Republic Steel Corporation plants at Youngstown.

Anthracite Ash for Gardens

Pennsylvania anthracite ash has long been used to improve soils, but exact scientific data on such utilization is now being made available for the first time. Specific instructions and suggestions for its use as a soil conditioner that costs nothing are contained in a booklet entitled "How to Improve Your Lawn and Garden With Pennsylvania Anthracite Ash," published by Anthracite Industries, Inc.

Compiling results of experiments conducted at the Mellon Institute of Industrial Research by the Multiple Industrial Fellowship in Anthracite, the booklet shows that anthracite ash has at least five advantages for gardening use in improving heavy soils alone: improved texture and workability of soil; better moisture absorption; reduction of erosion; improved drainage and aeration; and increased resistance to drought conditions.

"Since anthracite ashes are of a mineral nature," the booklet points out, "their beneficial effect is permanent. In this respect they are superior to humus of other organic materials, which tend to disappear from the soil in several years' time. A still further advantage is that humus and soil-conditioning materials are expensive—while anthracite ashes are readily available in the hard-coal-heated home at no cost."

Suggestions for the improvement of lawn or garden soils are given both as to quantities and methods of application of the ash, with outlines of procedure for the more scientifically minded or pro-

fessional gardener for conducting his own experiments. Descriptions of additional uses also are given, including utilization as a summer mulch, for underdrainage, for making compost, for soilless culture, even for growing rhubarb in the basement during the winter months.

Distribution of the booklets—printed in pocket size and well illustrated—is being effected through coal-trade channels.

Timely Problems to Engross West Virginia Institute

Mechanical loading, cleaning, transportation and Duckbill shakers for trackless mining will be featured topics at the annual meeting of the West Virginia Coal Mining Institute, to be held Nov. 10 at the Hotel Morgan, Morgantown, W. Va. The program is as follows:

"Mechanical Loading With Rubber-Tired Haulage," Arthur Knoisen, Joy Mfg. Co., with discussion by Glenn Toothman, Hutchinson Coal Co.; "Organization for Mechanical Loading," Frank Christopher, Christopher Mining Co.; "Mechanical Cleaning," Joseph Pursglove, Jr., Pursglove Mining Co., with discussion by Leonard Sargeant, Fairmont Machinery Co., and P. D. Everly, Island Creek Coal Co.; "Welded Rails on Main-Line Track," Charles Hagenback, Hanna Coal Co., with discussion by Prof. G. P. Boomsliter, College of Engineering, West Virginia University; "Power Requirements in Connection With Mechanical Loading," R. E. David, Appalachian Power Co.; "Dry Cleaning of Fine Sizes," H. D. Bowker, preparation engineer, West Virginia Coal & Coke Corporation, with discussion by Max Forester, district manager, Consolidation Coal Co.; "Use of Automatic Duckbills in Connection With Shaker Conveyors for Trackless Mines," D. M. Duncan, Goodman Mfg. Co., with discussion by P. G. Carroll, Hitchman Coal & Coke Co.

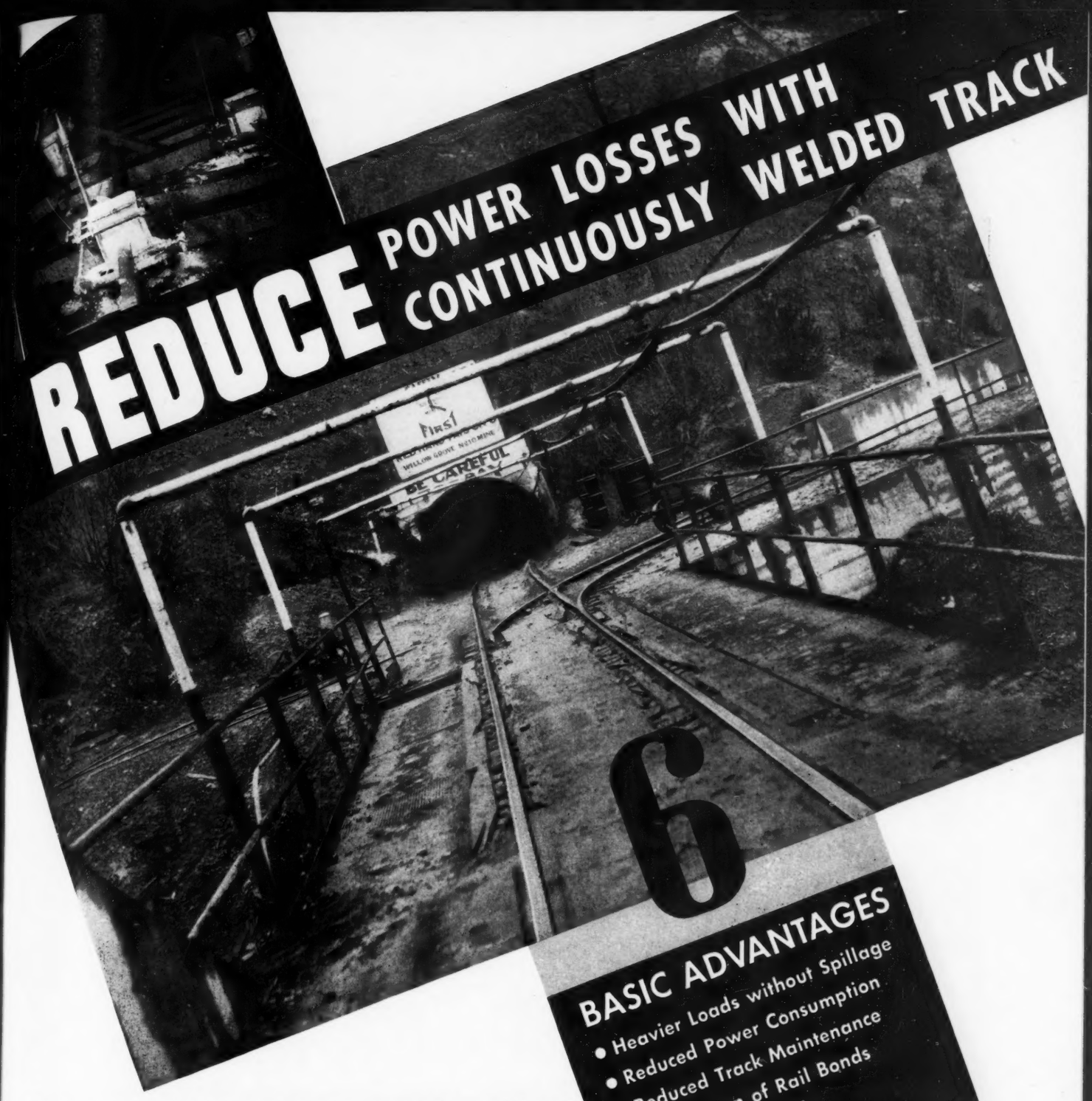
Dorr Co. Has Annual Outing

The 22d annual picnic of the Dorr Co., Inc., was held Aug. 26 at its Westport (Conn.) mill, laboratories and testing plant with 211 members of the company staff and guests present. Land and water sports featured the festivities in addition to a brief talk by Mr. Dorr on the European situation, based on personal observations in England, France and the Netherlands during a recent trip abroad.

Safety Teams in Close Race

First-aid teams from the Colorado Fuel & Iron Corporation mines took the first four places in the contest staged as part of the Labor Day celebration at Walsenburg, Colo. Top honors were won by the team from Cameron mine, with 1,494 points out of a possible 1,500; second, Frederick team, with 1,492; third, Sopris team (also from Frederick mine), 1,488; fourth, Kebler team, 1,487. Two other teams competed. Teams from Cameron, Frederick and Segundo, all C.F.&I. operations, finished in the order named in the contest for boys.

A spectacular feature of the day was



6

BASIC ADVANTAGES

- Heavier Loads without Spillage
- Reduced Power Consumption
- Reduced Track Maintenance
- Elimination of Rail Bonds
- Increased Rail Life
- Faster Haulage

By eliminating rail joints, and doing away with the need for rail bonds, Thermit welded track can reduce your power losses to a minimum.

Thermit welds have electrical conductivity equal to that of the rail itself. In fact, approximately 20% greater conductivity is obtained in Thermit welded track than in new track bonded in the usual way. And, this high conductivity of Thermit welds is permanent. It remains the same as long as the rail is in service. Power losses can never develope, as they do where there are plates and bonds to corrode and become defective.

You don't need to make a detailed study to determine these facts. Just visit a mine where Thermit welded track is installed and see how locomotives pick up pep on the welded stretches.

For more detailed information on Thermit Rail Welding, write for the pamphlet, "Continuous Rail for Main Haulage Track," or ask to have a representative call. No obligation, of course.

THERMIT Rail WELDING

METAL & THERMIT CORPORATION, 120 BROADWAY, NEW YORK, N. Y.
ALBANY · CHICAGO · PITTSBURGH · SO. SAN FRANCISCO · TORONTO

a "mine explosion" staged in an above-the-ground "tunnel" built for the purpose. Here coal dust was exploded to show what happens in a mine unprotected by rock-dusting and other safety measures. The structure was demolished in the dust blast.

Alamo Mine Prepared to Reopen

Preparations were started late in August for reopening the Alamo mine, near Walsenburg, Colo., formerly operated by the Alamo Coal Co. The operation, which has been shut down for several years, has been leased to a Denver concern, according to W. W. Cowdery, president, Huerfano Development Co., owner of the property.

P. & R. Mine Leased

The Philadelphia & Reading Coal & Iron Co. colliery at Cass Township, Schuylkill County, Pa., has been leased to the community-organized Primrose Coal Co. When the Lytle Coal Co. gave up its lease on the mine, the 800 employees formed the new company and obtained a lease for fifteen years on a royalty basis, guaranteeing the Reading company a minimum yearly rental of $11,000. Federal Judge Oliver B. Dickinson approved the lease, his permission being necessary because the Reading company is undergoing reorganization.

Stearns Mines Take Honors

Mine No. 4 team of the Stearns Coal & Lumber Co. took first honors at the Southern Appalachian District first-aid contest, held Aug. 26 at Stearns, Ky. For this achievement each member of the team received a bronze trophy from the National Coal Association. Teams from mines Nos. 18, 11 and 4 captured second, third and fourth places, respectively.

Obituary

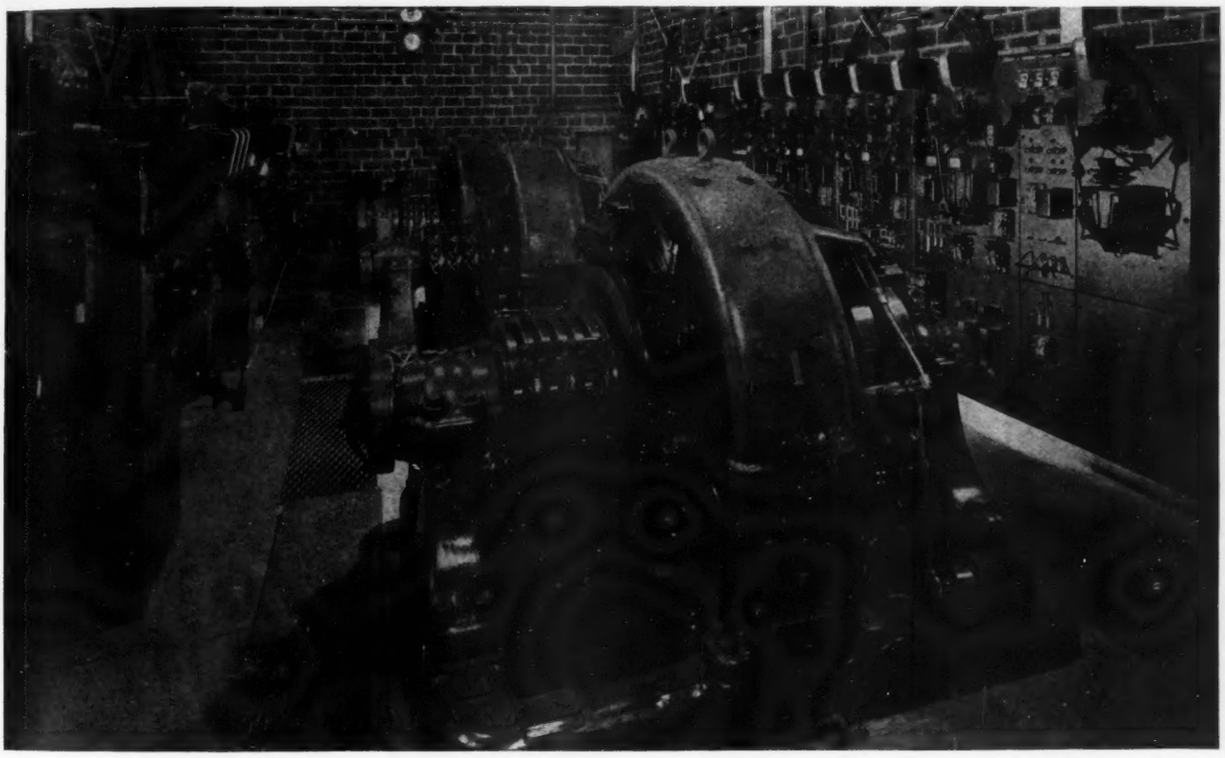
FRANK PASSARELLI, 42, president of the Pompey Coal Co., Jessup, and the Supreme Coal Preparation Co., Scranton, Pa., died Aug. 29 in Los Angeles, Calif.

FRANK MILEY, 49, president of District 30, United Mine Workers, died Sept. 10 in Fairmont, W. Va., of a heart attack.

WILLIAM MCKELL, 68, sole owner and for many years head of the McKell Coal & Coke Co., with operations in Fayette and Raleigh counties, West Virginia, died Aug. 24 at Chillicothe, Ohio, after two years of ill health. He became treasurer of the company when it was founded by his father in 1900, taking over control in 1904, when the elder McKell died. He had several skirmishes with the United Mine Workers, declining to sign with the union after the current Appalachian agreement was negotiated last spring. Operations were resumed at his plants in June, however, with many of the older

FULL-AUTOMATIC CONTROL

...for mining installations of MOTOR-GENERATOR SETS • ROTARY CONVERTERS • MERCURY ARC RECTIFIERS



I-T-E engineers have pioneered many full-automatic control features for industrial use and have given special attention to the requirements of mining applications.

Let I-T-E tell you of our latest developments as they would be applied to your specific needs.

Completely automatic substation, in the photograph above, is an interesting example of modern I-T-E protection and control. The view shows a three-unit, 600 volt, rotary converter substation now operating without attendance in providing more power for trolleys serving the World's Fair at New York.

A copy of our Bulletin 3905, which gives a detailed description, is available for you.

Representatives in Principal Mining Areas

I-T-E CIRCUIT BREAKER CO., PHILADELPHIA, PA.

employees at work without an agreement.

MAXWELL S. BARKER, 88, former president of the Straight Creek Coal Co., Straight Creek, Ky., died Sept. 11 at his home in Louisville after an illness of two months. A graduate of the University of Kentucky and Louisville School of Law, he became interested in southeastern Kentucky coal-land development early in his business career.

Progressives Top U.M.W.

A collective bargaining election held at Mine No. 1 of the Wisconsin Steel Co., Benham, Ky., resulted in a victory for the Progressives over the United Mine Workers by a vote of 275 to 138. The election, ordered by the National Labor Relations Board, was held on Sept. 6.

Industrial Notes

ALLIS-CHALMERS MFG. CO. has established a new branch office in the U. S. Trust Building, Louisville, Ky., with W. E. Kercheval in charge. The Chattanooga (Tenn.) office, of which D. S. Kerr is manager, has been moved to the Chattanooga Bank Building.

PRODUCTIVE EQUIPMENT CORPORATION has appointed L. D. Peik, N.B.C. Building, Cleveland, Ohio, as sales representative in that territory, and the Western Machinery Co., with offices in Sacramento and Los Angeles, Calif.; Spokane, Wash., and Denver, Colo., as agents in the West.

MORRIS MACHINE WORKS, Baldwinsville, N. Y., has appointed M. H. Morris as president; J. L. Lonergan, vice-president and general manager, and A. G. Forssell, second vice-president.

GENERAL ELECTRIC CO., has appointed Manly E. Lord, of Schenectady, N. Y., as manager of the Fort Wayne (Ind.) works, vice Neil Currie, Jr., who is relinquishing that post to become assistant to the vice-president in charge of manufacturing.

WHITCOMB LOCOMOTIVE CO., Rochelle, Ill. (subsidiary of Baldwin Locomotive Works), has named H. V. Huleguard as general manager.

CHAIN BELT CO., Milwaukee, Wis., has acquired the business and all of the net assets of the Baldwin-Duckworth Chain Corporation, Springfield, Mass., which will be merged with the former.

BUCYRUS-ERIE CO. has moved its Southern district office from Birmingham, Ala., to the William-Oliver Building, Atlanta, Ga.

THOMAS LAUGHLIN CO., Portland, Me., manufacturer of drop-forged hardware, has appointed Harold G. Jones, Pittsburgh, Pa., as agent for western Pennsylvania, West Virginia and eastern Ohio.

R. G. LETOURNEAU, INC., Peoria, Ill., manufacturer of mining and stripping equipment, has elevated its general manager, Dean M. Burgess, to vice-president.

CRANE CO., Chicago, has promoted H. H. Simmons, advertising manager, to manager of advertising and sales promo-

tion, succeeding Russell G. Creviston, who assumes a new position, director of trade relations.

McNALLY-PITTSBURG MFG. CORPORATION has transferred C. W. Waterman, Jr., for the last six years sales engineer in its Beckley (W. Va.) office, to the main sales office, in Chicago.

Bids In Isaban Property

A bid of $50,000 by George Coffee for the properties of the Isaban Coal Co. at Isaban, W. Va., made at public sale late in August, has been confirmed by Special Circuit Judge George S. Wallace. The company has been operating under receivership for several months.

Mine Accident Fatality Rate Shows Moderate Advance

Accidents at coal mines in the United States caused the deaths of 74 bituminous and 17 anthracite miners in July last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors. With a production of 29,490,000 tons, the death rate among bituminous miners was 2.51 per million tons, compared with 2.48 in the corresponding month of last year.

The anthracite fatality rate in July last was 5.84, based on an output of 2,913,000 tons, against 5.04 in July, 1938.

For the two industries combined, the death rate from accidents in July last was 2.81, compared with 2.74 a year ago.

Fatalities during July last, by causes and States, as well as comparable rates for the first seven months of 1938 and 1939, are shown below:

New Eagle Mine in Production

With a steel tipple completed and cages installed, the new Eagle mine of the National Fuel Co., in Weld County, Colorado, began taking coal from the main shaft early in September. At that time two loading machines were being installed, and it was expected that by the end of the month the mine would be in full swing.

Trade Literature

AERIAL TRAMWAYS—Interstate Equipment Corporation, New York City. Catalog describes a number of systems for coal, ore and refuse handling. Pictures show equipment in operation as well as views of various systems.

ARC WELDER—Lincoln Electric Co., Cleveland, Ohio. Welder Specification Bulletin No. 334 outlines features and advantages of the "Shield-Arc Junior" 200-amp. belted or direct-driven model, with a number of on-the-job illustrations.

ASH-HANDLING SYSTEMS — Allen-Sherman-Hoff Co., Philadelphia, Pa. Catalog 639 describes Hydrojet systems for use with various types of furnaces, with basic arrangements and operating and construction advantages.

BALL-BEARING LINESHAFT BOXES—Fafnir Bearing Co., New Britain, Conn. Form AD348 covers the company's entire line of ball-bearing lineshaft boxes. Complete details and specifications are given on all types of Fafnir hanger boxes as well as general information on lineshaft construction. Tables provide spacing data for

UNITED STATES COAL-MINE FATALITIES IN JULY, 1939, BY CAUSES AND STATES

State	Underground: Falls of Roof	Falls of Face	Haulage	Gas or Dust Explosions	Electricity	Machinery	Other Causes	Total Underground	Open-Cut and Surface: Falls of Persons	Electricity	Total Surface	Grand Total
Alabama	..	..	1	..	..	..	..	1	..	..	..	1
Arkansas	..	..	..	3	..	..	..	3	..	..	..	3
Illinois	2	..	1	..	..	..	1	4	..	..	..	4
Iowa	1	..	..	..	..	..	..	1	..	..	..	1
Kansas	..	..	..	..	..	..	2	2	..	..	..	2
Kentucky	4	1	..	28	2	..	..	35	..	..	..	35
Montana	1	..	..	..	..	..	..	1	..	..	..	1
Ohio	..	..	..	..	..	..	..	..	..	2	2	2
Pennsylvania (bit.)	6	..	2	..	..	..	..	8	..	..	..	8
Virginia	1	..	..	..	..	..	..	1	..	..	..	1
Washington	..	..	1	..	..	..	..	1	..	..	..	1
West Virginia	7	..	5	..	1	1	..	14	1	..	1	15
Total (bituminous)	22	1	10	31	3	1	3	71	1	2	3	74
Pennsylvania (anthracite)	11	2	2	1	..	..	1	17	..	..	..	17
Grand total	33	3	12	32	3	1	4	88	1	2	3	91

FATALITIES AND DEATH RATES AT UNITED STATES COAL MINES, BY CAUSES*

January-July, 1938 and 1939

Cause	Bituminous: Number Killed 1938	1939	Killed per Million Tons 1938	1939	Anthracite: Number Killed 1938	1939	Killed per Million Tons 1938	1939	Total: Number Killed 1938	1939	Killed per Million Tons 1938	1939
Underground:												
Falls of roof and coal	251	214	1.443	1.122	81	73	2.950	2.476	332	287	1.648	1.303
Haulage	74	66	.425	.346	14	13	.510	.441	88	79	.437	.359
Gas or dust explosions:												
Local	13	6	.075	.031	1	1	.036	.034	14	7	.069	.032
Major	60	28	.345	.147	18	...	.655	.....	78	28	.387	.127
Explosives	13	5	.075	.026	7	10	.255	.339	20	15	.099	.068
Electricity	23	21	.132	.110	2	1	.073	.034	25	22	.124	.100
Machinery	10	11	.057	.058	...	...	.....	.....	10	11	.050	.050
Shaft	3	2	.017	.010	3	4	.109	.136	6	6	.030	.027
Miscellaneous	11	7	.063	.037	9	8	.328	.271	20	15	.099	.068
Stripping or open-cut	3	3	.017	.016	8	3	.292	.102	11	6	.055	.027
Surface	18	14	.104	.073	5	10	.182	.339	23	24	.114	.109
Total	479	377	2.753	1.976	148	123	5.390	4.172	627	500	3.112	2.270

* All figures subject to revision.

mounting hanger boxes with couplings, standard keyseats for shafts, horsepower of shafting and belting, and suggestions for lubrication.

BATTERIES—Electric Storage Battery Co., Philadelphia, Pa. Catalog Section MP-I covers Exide-Ironclad batteries in motive power service, giving complete data on operating characteristics, capacities, sizes and general description of the complete line in this service.

BLAST CLEANING AND DUST-COLLECTING EQUIPMENT—Pangborn Corporation, Hagerstown, Md. Folders 2045 and 2046 carry forward the company's campaign for dust control, featuring the "Dust Hog" as the symbol of waste and costly neglect.

BOILER-ROOM INSTRUMENTS—Brown Instrument Co., Philadelphia, Pa. Booklet 29-31 provides data from which a suitable plan of instrument equipment, covering most operating needs, may be easily worked out for any steam plant. Feedwater temperature, saturated steam flow and CO_2 tables point out the possibilities in fuel saving.

CABLE-REEL GATHERING LOCOMOTIVES—General Electric Co., Schenectady, N. Y. GEA-3234 cites features of sealed-equipped units for haulage in gassy mines, the electric equipment being designed to comply fully with Bureau of Mines requirements of explosion-proof construction.

FAN-COOLED MOTORS—General Electric Co., Schenectady, N. Y. GEA-1326D points out advantages of its totally inclosed fan-cooled motors (squirrel-cage, frames 224-405). Details are described and illustrated.

CHAINS AND SPROCKETS—Whitney Chain & Mfg. Co., Hartford, Conn. Catalog V135 describes Whitney silent chain drives, citing many features and advantages and presenting complete engineering data.

CHAIN SPROCKETS—Webster Mfg., Inc., Tiffin, Ohio. Catalog 60-A presents the company's line of materials handling equipment, covering a wide range of industries and including coal tipples, coal yards, coke handling, etc. Dimensions, weights, strength and prices are included.

ELECTRICAL EQUIPMENT—Ohio Brass Co., Mansfield, Ohio. Catalog 22 is devoted to O-B mining and industrial products, including a listing of materials for mine service, rail bonds, locomotive equipment, control devices, catenary materials, and mine-car couplers.

GATE VALVES—Crane Co., Chicago. Circular 311 gives complete information on a new line of gate valves made with wedge disk, union bonnet and rising stem, known as Nos. 422 and 423. They are recommended for steam, water, oil or gas lines.

HOTMILL FOR JACKBITS—Ingersoll-Rand Co., Phillipsburg, N. J. Folder Form 2579 describes a production machine, known as the Jackmill, developed for reconditioning the detachable rock-drill Jackbit; operation and construction features are cited.

LAMINATED SHIMS—Laminated Shim Co., Inc., Long Island City, N. Y. Folder 1142 is an application chart showing the wide variety of industries in which Laminum shims find use.

VARIABLE-SPEED TRANSMISSION — Link-Belt Co., Philadelphia, Pa. Book 1574 describes two new sizes of P.I.V. gear units, ranging up to 15 hp. and up to 6 to 1 speed ratio, furnished for horizontal or vertical mounting, motorized or without integral motor, and with or without extra speed-reduction-gear sets.

WIRE ROPE—Hazard Rope Division, American Chain & Cable Co., Wilkes-Barre, Pa. Catalog 20 contains practical and technical information in addition to specifications and list prices of the various constructions of wire rope.

Anthracite Mines Resume

Maintenance men were summoned Aug. 31 by the Kehoe-Berge Coal Co. to prepare the William A colliery, Pittston, Pa., for resumption of operations. The colliery, which normally employs 800 to 1,000 men, resumed production Sept. 5. No. 14 colliery of the Jermyn-Green Coal Co. also resumed operations that day.

Hillman Absorbs Rainey

J. H. Hillman & Son, Pittsburgh, Pa., has purchased the stock of W. J. Rainey, Inc., and has taken over active direction at its offices in Pittsburgh and New York. As a result of the merger the Hillman company will handle more than 2,500,000 tons of coal as well as coke, pig iron and other products.

Monarch in Receivership

Upon petition of Thomas H. Dickson, of the Dickson Coal Co., and other stockholders, the Monarch Anthracite Mining Co., Inc., Scranton, Pa., headed by James H. Pierce, was placed in receivership late in August. Francis O. Stone, Scranton, was named receiver by the court.

Letter to the Editor

Mr. Hall's spendid description of the aerial disposal plant at the new Huber breaker of the Glen Alden Coal Co., at Wilkes-Barre, in your August issue, is very complete indeed, but it is not by any means the first aerial disposal plant in the anthracite region.

The Philadelphia & Reading Coal & Iron Co. had aerial disposal plants for refuse 20 years ago, at their Burnside, Potts and Eagle Hill collieries, and Mr. Bunting, then the chief engineer for the Lehigh & Wilkes-Barre Coal Co. (now Glen Alden), was so impressed with them that he had photographs made of them, and was furnished with plans of the layouts. I was also informed by a photographer that 40 years ago he took photographs of an aerial disposal plant for refuse at the old Treskcow stripping operations of the Lehigh & Wilkes-Barre Coal Co., near Audenried.

The old story still holds, "There is nothing new under the sun." Only improvements are made, and what a sad world it would be if we did not advance!

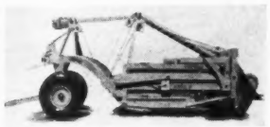
G. B. HADESTY
Pottsville, Pa.

WHAT'S NEW

In Coal-Mining Equipment

CARRYALL SCRAPERS; POWER-CONTROL UNIT

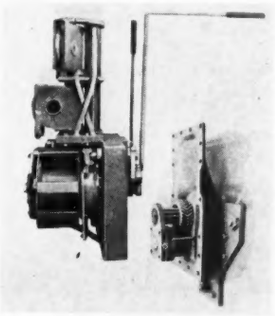
R. G. LeTourneau, Inc., Peoria, Ill., has introduced a new single-bucket scraper, the Model P Carryall. Light weight for capacity, new tailgate sheave arrangement, higher



sides to retain all of the load, and a stronger yoke distinguish the new model. Although moving 15 yd. heaped per trip, it weighs only 18,200-18,600 lb. (depending on tire equipment). The tailgate sheaves are placed on the sides of the bowl instead of on the top so as to keep them free from dirt and to control the tailgate efficiently from the center of the load rather than the top. A positive ejector tailgate—cable-controlled — gives regulated dumping in any required thickness, and fractional-inch control of the cutting blade results in a wide margin of scraper usefulness.

LeTourneau also offers the Model W carryall scraper, rated at 23 cu.yd. heaped. Features cited by the manufacturer are: large single bucket; special alternate curved and straight cutting blades placed at a plowlike natural-suction digging angle for bailing loads in easily; positive wipe-out ejection tailgate that quickly cleans the bowl; and a new large sheave arrangement that reduces cable strain, facilitates load handling, and keeps dirt out of the sheaves and cable.

A new power-control unit, the Model T, is announced by LeTourneau. Advantages claimed for it are: interchangeable neck and gear case; interchangeable drums of varying cable lengths; new brake assembly, using Timken bearings, that takes the play and slack out of the brake and gives the operator accurate hair-trigger control; interchangeable reduction gear sets for the neck—to regulate and control line speeds; improved brake and clutch assembly that automatically eliminates all brake-drag when the clutch is engaged; "Velvetouch" brake lining for long-wearing, smooth



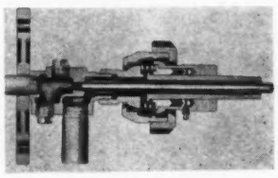
operation (optional); controlled lubrication through new oil ring; and herringbone gears at vital points for power and strength.

TROLLEY-WIRE GUARD OF RUBBER

Manhattan Rubber Mfg. Division, Passaic, N. J., offers the Condor rubber trolley-wire guard, designed to promote safety in mines by preventing workers from being burned or electrocuted from contact with live wires. Unlike wooden guards, it is flexible and is not knocked down when the trolley pole jumps the wire. The guard also is an insulator and requires no special hangers.

REVOLVING JOINT

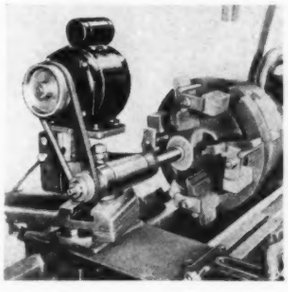
A new revolving joint—Type 7R-8CR—which provides movement in all directions in connecting piping to revolving drums or other revolving apparatus is offered by the Barco Mfg. Co., Chicago. The only part that revolves is the rotating sleeve, which also slides out and in to take care of any end play in the revolving drum. The double-ball design provides flexibility to compensate for any slight misalignment or eccentricity of movement. A siphon—18-R—is used when it is desired to feed two different fluids into the revolving drum or siphon out condensate through the same opening.



TOOL POST GRINDER

A new tool post grinder, called the "All-purpose" grinder because of its general applicability, is offered by the R. G. Smith Tool & Mfg. Co., Newark, N. J. The tool is mounted on a spherical adapter, enabling the operator to adjust the grinder accurately and quickly to the center of the work—in any plane and at any angle.

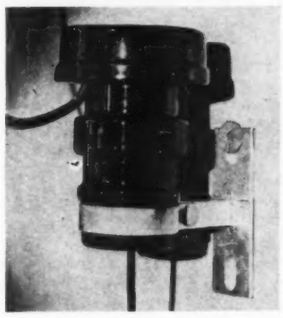
Features claimed for it are: accurate internal thread grinding; automatic and correct belt tension with no sliding of motor or other adjustment necessary; eight speeds obtainable by switching pulley and sheave, the holes in the sheave and pulley being the same size; wear easily taken up without disassembling; standard surface grinder wheels fit



the spindle either in standard or special thicknesses; for certain jobs, where desired, the wheel can be placed on the drive end of the spindle; a large tapered sleeve bearing is provided at the grinder end of the spindle and a ball bearing at the drive end; motor is dynamically balanced, which, together with the vibration-absorbing spring, prevents transmission of vibration to the spindle; motor and bearings are completely inclosed against dust and dirt; a wick felt keeps spindle well lubricated so that it seldom requires oiling; one oil hole cares for the entire spindle.

ELECTRICAL AIDS

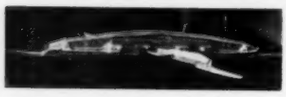
An improved form of LV lightning arrester device for protecting power-distribution systems from lightning has been announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. According to the manufacturer, four important improvements are built into the new unit: a change in the blocks or valves increases surge-current capacity; an entirely new insulating coating for the sides of the blocks reduces external flashover; a special terminal plate improves uniformity of per-



formance. Several improvements in the quench and porcelain gaps increase the range of power-follow currents that will be interrupted and decrease the likelihood that an arrester failure following a lightning discharge will leave the line short-circuited. The new arrester is available for distribution circuits where maximum line-to-ground voltages are 3,000, 6,000 or 9,000.

A new adjustable insulated trolley crossover is offered by Westinghouse. Instead of a wooden beam, the new crossing has a solid metal backplate that will not deteriorate because of weather or strain. An insulation of wood is used to separate the wires. One wire runs over the top of the metal plate, which takes up the stress. In segregating one positive potential from another, the potential between the two wires is seldom above

75 volts. The crossover is used only to insulate one trolley line crossing another and cannot be used as a section insulator in one common line. The complete underrun is removable without taking the entire crossover from the line.



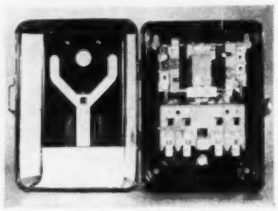
The length over-all, 43 in., is considerably shorter than formerly used. The adjustable metallic member has a range from 30 to 90 deg.

Said to feature quiet operation with minimum windage noise and radio frequency-tested insulation, a new design for 3,600-r.p.m. 600-3,000-hp. induction motors is announced by Westinghouse. Bearings for the new apparatus are combination oil ring and forced-lubricated. The wide-grooved rings provide lubrication for emergencies and during interruptions that might occur to the forced-lubricated system. Particularly adapted to centrifugal-pump and compressor drives where reliability and low maintenance are important, says the maker, these motors are built so that they may be started at either full or reduced voltage. They deliver normal starting torque with normal starting current. Dynamically balanced rotors, bearings permanently aligned, no moving contacts, and directed ventilation for cool running make for less maintenance.

A new heavy-duty pushbutton unit and an improved design of wide flush-plate-mounted pushbutton are announced by Westinghouse. The new apparatus consists of a double-pole double-throw pushbutton mounted in the same space as the ordinary single-pole double-throw unit for use in all types of heavy-duty pushbutton stations. It has four contacts, two on each side of the button. This unit is supplied with either standard or long button, and mounting bracket can be provided for $\frac{1}{8}$-in. panel mounting, if desired. The flush-plate mounted stations have a wider plate for mounting in a plastered wall or in the machine casting. Plate sizes are: $6\frac{3}{8}$x$4\frac{1}{2}$ in. for single-button stations; $8\frac{1}{4}$x6 in. for two-button stations, and $10\frac{1}{4}$x$7\frac{3}{4}$ in. for three-button stations.

Ability to carry peak overloads, and at the same time to disconnect transformers automatically from the lines in case of internal trouble, is made possible by a new kind of protective link developed by Westinghouse, connected between the bushing terminal and the winding. Small enough to be held in one hand, three of them can interrupt 500,000 kva., three-phase, at the first zero point of the current. Several sizes of these links make the scheme applicable to transformers of from 2,400 to 60,000 volts. The definite thermal characteristics of this link, says the maker, permit it to be coordinated with other current-disconnecting devices on the system, in addition to permitting the transformer to carry useful peak overloads.

A new, small and inexpensive cross-the-line starter for ratings up to 2 hp., 220, 440 and 550 volts, two- and three-phase and equivalent ratings on single-phase, is announced by Westinghouse. They are



used for across-the-line starting of squirrel-cage induction motors and as primary switches for wound-rotor induction motors. Typical applications include machine tools, conveyors and pumps. These new starters are available as plain across-the-line starters or in combination with motor circuit switches and Nofuze circuit breakers in standard inclosures. Features include De-ion arc-quenching and snap-action bimetal disk overload relay. This smaller unit employs the same line of heaters as the larger linestarter which it supplements and as the De-ion "Motor Watchman" manual starters.

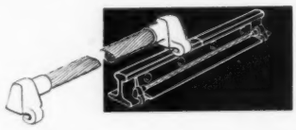
CIRCUIT BREAKER

A new low-cost circuit breaker has been added to its line of Multi-BreakeRs by the Square D Co., Detroit, Mich. The new unit, which combines switching and overcurrent production, says its maker, will place modern low-cost circuit protection within the reach of all at only a fraction more than switch and fuses.

The new unit is designated as Type MO Multi-BreakeR and is to be available in 15-, 20- and 25-amp. sizes for 115/250-volt single- and two-pole applications where Type D fusible switches have been used. It is $6\frac{1}{8}$ in. high, 4 in. wide and $2\frac{7}{8}$ in. deep and is adapted to flush or surface mounting; no live parts are exposed. According to the manufacturer, it is factory calibrated and sealed and will always interrupt the circuit under the same overload conditions, but will not open the circuit during the brief periods of high inrush circuit encountered in starting motors. There are no parts to replace to restore service—just flip the switch.

RAIL BOND

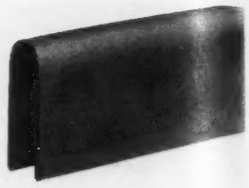
A rail bond, known as Type M-12-F, especially designed to save the consumer the cost of 6 in. of copper cable has been developed by the Mosebach Electric & Supply Co., Pittsburgh, Pa. The length required for installation of this bond is only 2 in. longer than the fishplate or angle-bar length.



Installed on the top of the rail base, it fits snugly to the edge of the angle bar. Hooks on the terminal hold the rail bond in position for arc-welding with steel electrodes—according to the manufacturer, the extra welded strength and minimum bond length mean lower resistance. The solid-steel terminal protects the weld from excessive heat during mine installation. The bond can be readily reclaimed by breaking the weld with a chisel and then prying off the bond.

RUBBER TROLLEY GUARD

For insulating the trolley wires in mines, the Cincinnati Rubber Mfg. Co., Cincinnati, Ohio, has developed a trolley guard that not only protects the workmen from coming in contact with the trolley wire but also serves as a protector against electrical shocks should any metal or other substance strike the wire. Pacemaker trolley guard, as the new product is known, is a U-shaped sheet of rubber, $\frac{3}{32}$ in. thick and 11 to 13 in. outer circumference, and has an insertion of cloth in the rubber. Being U-shaped it fits over the trolley wire but is open at the bottom, allowing the trolley to pass through. It is furnished in 50-ft. lengths.

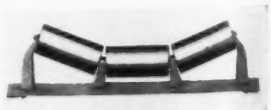


WHEEL-BEARING LUBRICATOR

A new-type wheel-bearing lubricator is announced by the Alemite Division of the Stewart-Warner Corporation, Chicago. According to the manufacturer, it is adaptable to both ball and roller wheel bearings on all modern makes of cars and trucks. After being thoroughly cleaned, a bearing is placed in the lubricator around a hollow threaded spindle equipped at the top with a standard Alemite fitting. The bearing is sealed tight to the sides of a cone by adapters which are held in place by a clamp screwed down over the spindle. Lubricant is forced down through the spindle into the apex of the inverted-cone-shaped lubricator. Under pressure the lubricant is forced into the bearing. After release of clamp and adapters the bearing is ready for replacement in the wheel.

BELT IDLERS

"Series 43" belt idlers, newly introduced by C. O. Bartlett & Snow Co., Cleveland, Ohio, have self-cleaning bascs with support brackets assembled in jigs to assure proper alignment and correct spacing. Slotted holes are provided in the mounting plates to permit adjustments in aligning the



belt. The idler rolls are machine-faced on the ends and pressed onto the shoulders of the cast roll ends, whose outer edges have been rounded and smoothed to prevent injury to the belt. The free-running anti-friction bearings are protected with labyrinth grease seals, and a through grease tube is provided from one bearing to the other.